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Railway Age

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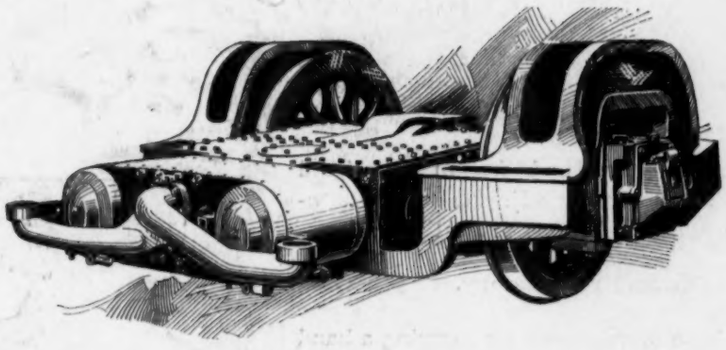

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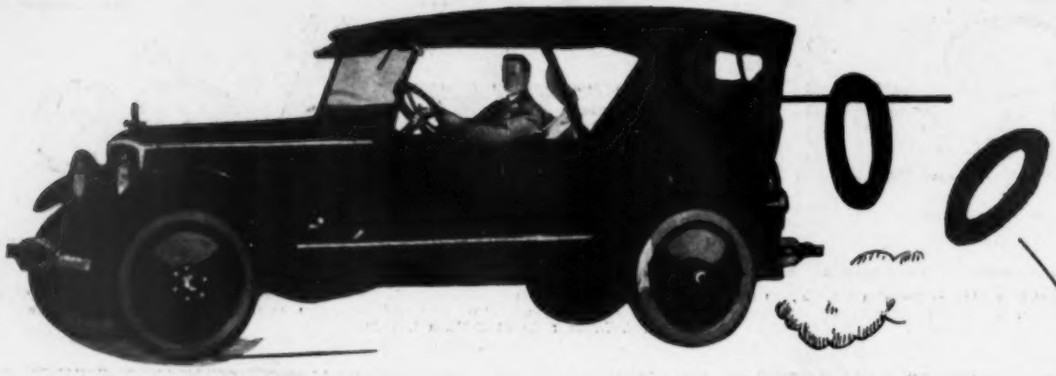

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EDITORIAL

Railway Age

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More About Safety Statistics

Attention has been called by one of our readers to a mistaken impression given by the editorial, "Safety Work Pays," which appeared on page 317 of the August 23 issue of the *Railway Age*. To emphasize what has been accomplished by the application of modern safety methods in railway shop operation, this editorial pointed out the decrease from 2,550 employees killed in 1900 to 1,866 in 1923, in spite of an increase of about 46 per cent in the number of employees. At the same time the editorial mentioned the increase from 39,643 to 148,146 employees injured during the same period and neglected to explain fully the reason for this increase. While some industrial accidents to employees were doubtless included in reports previous to 1911 the report for the year ending June, 1911, was the first to include industrial accidents to employees in the engineering, mechanical and other departments. The classification placed in effect for that year included employees working on tracks or bridges; at freight houses, enginehouses, coaling stations, etc.; in and around shops; on boats and wharves; and at other places. The total number of such industrial accidents was 79,237 or almost 63 per cent of the total casualties in all accidents. This revision in classification was one important reason for the large increase in total railway accidents beginning in 1911. There was no intention to imply in the editorial that railroad shop practices are becoming less safe. In fact the reverse is true. Perhaps the banner performance to date is that of the Duluth, Missabe & Northern car department at Proctor, Minn., which records a period of 25 months and 2,412,800 man-hours without a single reportable accident.

Does the London Congress Interest You?

On another page we publish, almost in its entirety, the program of the International Railway Congress to be held in London beginning on June 22, 1925. From the number of our readers who have requested information from us concerning it, it would appear that there exists a real interest on the part of many American railway men in the plans for this congress. Consequently, if these plans as now announced come up to expectations, it seems not unreasonable to assume that a satisfactory attendance from this continent will be assured. But does the program promise discussions of sufficient interest to warrant an American railroad man in making a trip to England? This is a question which each one will have to answer for himself from the standpoint of the attention of the program-makers to problems in which his particular interest lies. Some general observations can, however, be made. In the first place, America is to be well represented in the official proceedings by some of its most capable railway officers. Secondly, among some of the railway problems to be discussed are several which are of great interest in this country—as, for example, protection of highway crossings, rail failures, fuel conservation, locomotive terminals and railways statistics. Again, with the sessions in England, the difficulty of language encountered when the Congress met in Rome will probably be minimized. Moreover, as was announced in the *Railway Age* last week, the plans involve excursions on the railways of Great Britain which should be of the greatest interest and value to visitors from North America. There are one or two points, however, wherein it seems that the program for the meeting might be improved. For example, this continent has no direct representation in the discussion of the problem of "light" railways. It is recognized, of course, that the European "light" railway is quite different from its counterpart here, which is generally a branch line of a standard railway. However, the problems to be solved are much the same and certainly in one of the branches under this heading—the use of railway motor cars—no discussion can be complete without direct participation by American railroad men, since nowhere else in the world is experiment in this field being carried on more actively that it is here. Other criticisms, favorable and otherwise, will occur to everyone who reads the program. On the whole, however, it is quite comprehensive and few railroad men will fail to find in it some subject of interest to them.

Economy in Painting Steel Passenger Cars

One of the important questions raised at the third annual meeting of the Equipment Painting Section of the American Railway Association, held at Chicago recently, was whether the railroads as a whole cannot effect a marked reduction in the cost of maintaining steel passenger equipment by a revision of the present method of painting. Quality paint and varnish are always high in first cost, yet cheapest in the end. The labor cost of application is also high. In re-painting sand blasted steel passenger cars it is probably accurate to say that the average railroad applies seven coats from the primer to the last coat of varnish. Occasionally the number of coats is increased to eleven or more and yet a few railroads, notably the Minneapolis, St. Paul & Sault Ste. Marie, have been able to reduce this number to four and still obtain satisfactory results in the protection of the steel and the appearance of the equipment. The "four-coat" system has been standard practice on the Soo Line for at least 12 years, with desirable results as far as appearances go and no indication that the cars will have to be re-sand blasted for a long time to come. Besides reducing the cost for labor and material, the application of only four coats enables cars to be put through the paint shop more rapidly. Durability is enhanced since, with the surfacing coats eliminated, a combined coat of paint and varnish of great elasticity is secured which can expand and contract with the varying temperature of the steel and therefore have far less tendency to crack and peel off. Some objections have developed to the "four-coat" system, perhaps the main one being that a sufficiently smooth appearance is not given to the cars. It must be admitted that a "piano-like" finish is not secured, but on the other hand, one may fairly ask whether the railroads are justified in expending the money required to obtain such a finish. The average passenger gets his impression mostly from the appearance of the inside of a car, providing the outside is clean and has a lustre-like finish. The average passenger is certainly not nearly as critical as the

foreman painter or his superior. Discussion at the meeting referred to brought out the fact that the question of the finish required is often determined by some "finicky" railroad officer who has set a standard higher than really called for by the circumstances. It is said that when the right kind of paint materials are used the difference in appearance between a car which has had four coats and one which has had seven or eight is hardly noticeable. Considering railroad steel passenger cars in the aggregate, the possibilities of economy through a reduction in the number of coats now normally applied in painting this equipment are apparently large.

Should We Be More Conservative?

The report of the Joint Committee on Concrete and Reinforced Concrete is an important technical document. Like that of its predecessor, the previous joint committee, it is certain to exert a marked influence on specifications for concrete construction. Even the progress report of the present committee, issued in 1921, was frequently quoted as authoratative in spite of its tentative status. So the latest report will generally be accepted and frequently cited as the last word on this important subject. There is always the danger that any general rules of practice such as are embraced in these specifications will fall into the hands of those who have not had the training or experience which will enable them to place the correct interpretation on the subject matter. There is also the possibility of misuse by the charlatan who will offer isolated clauses as justification for radical if not actually dangerous practices to clients who are not in a position to verify his statements. It is for this reason that some railway engineers are inclined to favor a more conservative basis for unit stresses than that offered in the Joint Committee's report. It is not the thought that the various percentages of ultimate strength for the different conditions of stress provide too small a margin between the working stress and the real ultimate strength. Instead the question uppermost in their minds is whether the concrete will in all cases have the ultimate strength *assumed* by the designer. They know of too many cases where it does not. In the hands of these seasoned engineers the joint committee's specifications will become an exceedingly valuable reference work. Their use by the novice might lead to unfortunate results.

What Will the Commission Do?

THE GUARANTEES of net return given by the government to the railways under government control and extended during the first six months after the roads were returned to private operation, expired at the end of August, 1920. Statistics of earnings and expenses in August, 1924, were issued this week and made it possible to compute the net operating income earned by the railways during the four full years that they have had to depend entirely upon their earnings.

The statistics regarding the net return earned during this four years constitute not only an altogether too complete refutation of the propaganda to the effect that Section 15a of the Transportation Act "guarantees" a certain fixed net return, but show that the great progress the railways have made in increasing the economy of operation and improving the service rendered by them has been made in spite of very adverse financial results. They show also that the Interstate Commerce Commission has fallen far short of performing the duty imposed upon it by the Transportation Act as it itself has defined that duty.

The Transportation Act directs the Commission to determine from time to time what will be a fair return for the railways to earn and to so fix rates, "as nearly as may be," that the railways under efficient, economical and honest management will be able to earn this return. No intelligent and fair student of the subject will deny that, on the whole, the railways during the last four years have been efficiently, economically and honestly managed. The Commission itself repeatedly has found that they have been so managed. The large reductions of operating expenses and the great improvements in service that have been effected are proof of it. The Commission determined that a fair return for the railways to earn on the tentative valuation made by it until March 1, 1922, would be six per cent and thereafter 5¾ per cent. When we take the tentative valuation made by the Commission as of December 31, 1919, and add to it the investment in property that has been made subsequently it is found that the total net return that the railways should have earned in the four years ended August 31, 1924, was $4,380,000,000. The net operating income actually earned in these four years was $3,152,000,000. The difference is $1,228,000,000, or an average of $25,600,000 a month for the entire time. The amount actually earned was only 72 per cent of what the Commission held the railways should earn.

The question must be raised as to how much longer the railways, in spite of efficient and economical management, are going to be so regulated that they will not be able to earn a fair return as defined by the Commission. Business was very bad in 1921 and under the conditions then existing the railways could not expect to be able to earn a reasonable return. Business was better in 1922, but it was not good and even if rates had not been reduced the railways would not have been able to earn a reasonable return. In spite of this the Commission made a large reduction of rates. Business was extremely good in 1923 but because of the reductions in rates made in 1922 the railways earned only about 5.2 per cent. Business has been only fair in 1924, and in consequence in the first eight months of this year the railways earned at the rate of only about 4.75 per cent on their valuation, or approximately $118,000,000 less than a 5¾ per cent return would have amounted to.

Railway business within recent weeks has become good again. It is probable that during the last four months of this year the net operating income will show a large increase. Meantime, however, the Commission is being urged to make reductions of rates. The traveling salesmens' organizations are demanding the abolition of the Pullman surcharge and an order requiring the issuance of scrip tickets at reduced rates. Both of these changes would tend to reduce net operating income. Furthermore, when net operating income begins to show an increase the Commission probably will again receive demands for reductions of freight rates.

What policy will the Commission adopt? Will its policy be to so regulate the rates to give the railways a chance in future to earn the return to which it has held they are entitled, or will it yield to demands for reductions and continue to render it impossible for the railways to earn that return?

It may be said that the railways themselves have furnished evidence that they do not need as much net return as the Commission has held they are entitled to because they have, in spite of the deficiency in the net return earned within the last four years, raised and invested large amounts of new capital and greatly increased their operating efficiency. But such reasoning would be fallacious. In 1922 and 1923 there were 288,761 new freight cars installed in service. But because for years before the number of freight cars acquired had been too small, the number that had actually been worn out but had been kept in service was very large and in consequence the number retired from service in 1922 and 1923 was 311,979. Likewise, the railways in these two

years placed in service 5,263 new locomotives but they had to retire 5,354. The new cars and locomotives have more capacity and power than those retired but the net increase in car capacity and locomotive power is comparatively small. In spite of the large increase in capital expenditures within the last two years the increase in the entire physical capacity of the railways has been comparatively small.

Furthermore, a very excessive part of the new capital that has been invested has been raised by borrowing. The railways must go on increasing the capacity of their plants. They must reduce relatively the amount of capital they raise by borrowing and increase the amount they raise by selling stock. If they are to do this the net income available for dividends must be largely increased. It cannot be increased except by increasing the net operating income earned.

Nobody can forecast the immediate future of general business in the United States. There seems, however, to be good reason for believing that a large increase in the production and commerce of the country is beginning. The railways still have surplus capacity, but the rapidity with which the car surplus has declined within recent weeks is an omen of significance. A continuance of heavy business and a severe winter with its adverse effect upon railway operation might bring a car shortage much more quickly than most people think.

Nor is the need for constantly increasing railway capacity the only thing to be considered. Large amounts of new capital could be spent in such a way as to make possible savings in operating expenses which would largely exceed the interest and dividends that would have to be paid upon this new capital. Premature reductions of rates would render it impossible to raise much of the capital needed, while if rates are so regulated as to enable the railways to raise the new capital required the operating economies effected will, in the long run, make it possible to reduce rates relatively much more than they ever could be reduced if rates should be reduced prematurely with the result of making it impossible for the railways to raise the new capital needed. The Commission is subject to pressure from many directions. There is no evidence, however, that it has reduced its prestige or injured the cause of fair and constructive regulation by resisting the pressure for unfair reductions of rates during the last two years, and it has never rendered the public so great a service as it has by resisting this pressure. If it had made reductions of rates within the last two years it would have been impossible for the railways to raise the capital with which to buy the new equipment that has been bought and make the improvements that have been made. If this equipment had not been bought and these improvements had not been made there can be no serious question that at the present time, instead of rendering the remarkably good freight service, and especially the extraordinarily good service in moving the crops, that they are, the railways would now have a large "car shortage" regarding which the railways and the Commission would be overwhelmed with complaints. The good service the railways are now rendering to the farmers is worth many times more to the farmers than a reduction of the freight rates on farm products to the pre-war basis would have been, and if rates had been reduced it would have been impossible for the railways to give the farmers the service they are now giving.

It was the Commission's duty before the Transportation Act was passed, and is now its duty as specifically defined by that law, to so regulate rates that they shall not only not be excessive, but that they shall also be such as to make it possible for the railways to furnish good and adequate transportation service, and it will not perform that duty unless in future it resists all pressure to cause it to so reduce the rates as to disable the railways from earning a fair and adequate net return.

How Farmers Are Benefiting By Good Railway Service

THE PRICES of most kinds of grain are the highest now that they have been since 1920. Furthermore, the railways during the present grain moving season are rendering the most and the best service to the grain farmers ever rendered in history. In the seven weeks ended on September 27 the total number of carloads of grain and grain products moved exceeded 460,000 cars. This was 121,500 more than in the corresponding weeks of 1919; 157,000 more than in 1920; 61,000 more than in 1921; 84,000 more than in 1922, and 87,000 more than in 1923.

In 1921, when the previous high record was made, the total freight business moving was the smallest it had been in six years and it was easy to devote a relatively large number of box cars to the handling of grain. Within recent weeks the total volume of freight business has been much larger than in 1921, and it has been relatively more difficult to devote a sufficient number of box cars to the handling of grain. Nevertheless, the previous high record of 1921 has been far exceeded. These facts constitute a significant commentary upon the two different policies of regulation of railways which have been advocated in the real or pretended interest of the farmers within recent years. On the one hand, men such as LaFollette and Brookhart have advocated a policy of drastic reductions of freight rates, especially on farm products. These reductions were to be made without any compensating reductions of wages, other operating expenses and taxes. On the other hand, railway officers, supported by most business men and students of economic problems, have advocated maintenance of existing rates upon the ground that reductions of rates would cripple the railways financially; that this would render them unable to furnish good service; and that the farmers would lose much more by having transportation crippled than they would gain by the proposed reduction of rates.

The Interstate Commerce Commission ordered large reductions of rates in 1922. However, wages also were reduced in 1921 and 1922, and the railway managements were able to effect other economies. Since then, in spite of great pressure from interested politicians, the Commission has refused to make any general reductions of rates. In refusing this year to reduce rates on grain it clearly indicated its belief that the reductions sought would cripple the railways and thereby do the farmers more harm than good. In consequence, although the railways in 1923 and 1924 have not earned as much net return as they need, they have done much better than in 1921 and 1922.

Let us now consider what would have been the effect upon the welfare of the farmers if the LaFollette-Brookhart policy of regulation had been adopted, and the effect upon their welfare that actually has been produced by the policy of regulation that has been followed.

If the LaFollette-Brookhart policy of permanently reducing the valuation of the railways by about one-third and of reducing rates without any corresponding reductions of operating expenses and taxes had been adopted the railways would have been in financial distress throughout the last two years and many if not most of them would have been bankrupted. Their ability to raise capital with which to buy new locomotives and cars and to increase the capacity of their terminals and tracks would have been destroyed. They would have been forced drastically to retrench in their expenditures for maintenance, and in consequence there would have been a great increase in the number of locomotives and cars in bad order and a serious impairment of their ability to handle freight.

Suppose after all this had occurred there had come in the

summer and fall of 1924, as there has come, a world-wide increase in the demand for American grain and a large and general advance in grain prices. The farmers, in order to take advantage of this favorable market situation, would have desired to ship their grain with great rapidity—as they actually are doing now. But they could not have done so. If the LaFollette-Brookhart policy had been adopted two years ago, as LaFollette, Brookhart and others tried to get it adopted, the railways of this country would be today in such a condition physically that they could not handle the traffic offered. There would be today, as there actually was in the falls of 1920 and 1922, a large "shortage of cars" in which to handle grain and other freight, and the farmers would be complaining bitterly about this car shortage and their losses from it.

There was a temporary advance in grain prices in 1922. The railways, however, were unable to handle the grain traffic satisfactorily. Julius H. Barnes, himself a large exporter of grain and then president of the Chamber of Commerce of the United States, estimated in a public address in October, 1922, that in consequence of the transportation conditions that then existed a loss of 400 million dollars was inflicted upon the farmers of the United States in the crop year 1922. If the same transportation conditions existed now, as they would if the LaFollette-Brookhart policy of regulation had been adopted, the inability of the farmers to ship a large part of their crops and take advantage of present market conditions would be costing them losses of many millions of dollars.

But the LaFollette-Brookhart policy was not adopted. The valuation of the railways has not been arbitrarily reduced. Their rates were reduced more than they should have been in 1922, but not enough to destroy their ability to maintain and increase their service. Their earnings have improved, and in consequence in the 19 months ending with July, 1924, they were able to buy and place in service 5,145 new locomotives and 271,397 new freight cars. Many of the old locomotives and cars which were worn out were scrapped meantime, but the net result has been an increase in the total capacity of the equipment. Other extensive improvements in tracks, terminals, etc., have been made. Large expenditures for maintenance have been made with the result that much equipment which was in bad order two years ago is now in good order. It is in consequence of these things, and of these things alone, that the railways are able at the present time not only to handle a record-breaking freight business but to move all the grain offered to them at a time when the volume of grain being tendered for shipment largely exceeds all previous records. The service the railways are rendering the farmers now has been pronounced unprecedentedly good both by the Department of Agriculture and by Eugene Meyer, Jr., managing director of the War Finance Corporation.

How much is this good railway service worth to the farmers compared with what the reductions of rates that were sought by radical public men would have been worth? Nobody can tell. Its effects are ramifying through every branch of the country's business, but nobody can accurately estimate its value to the people as a whole or to any particular class. There are available, however, some facts which throw light upon the question. The big increase in grain prices commenced in June. Some calculations we have made indicate that the total receipts of wheat, corn, oats and rye at the large terminal markets in June, July, August and September amounted to 13,193,000 tons. Between June 2 and October 2 the cash price of wheat in the Chicago market increased from $1.10 to $1.41 per bushel; corn, 77½ cents to $1.12½ cents per bushel; oats, 47½ cents to 52½ cents per bushel; rye 67½ cents to $1.22 per bushel. The average cash price of wheat throughout this period was 15.4 cents more than on June 2; the average for corn 30.4 cents more; of oats 5 cents more, and of rye, 22 cents more. It would appear that on the basis of these average increases in prices, the total amount paid for the grain received at the central markets was about $75,500,000 more than it would have been if the prices of June 2 had prevailed throughout the four months' period.

The Interstate Commerce Commission gives statistics regarding the average earnings per ton received by the railways for the transportation of wheat, corn, oats and rye. It would appear from computations based upon these statistics that the total freight charges upon the grain actually received at the large markets during these four months were about $62,200,000. Therefore, the mere *increase* in its value, based upon the prices of June 2, amounted to at least $13,200,000 more than the *total* freight charges paid upon it. In the last grain rate case before the Commission a general reduction of 10 per cent in the rates on grain was sought. This reduction would have amounted upon the grain actually received at the central markets within the last four months to $6,220,000, or about 8 per cent of the increase in its value. However, Senator LaFollette and his supporters advocated a reduction of freight rates on farm products to the pre-war basis. This would have been a reduction of approximately 36 per cent, and would have amounted on all the wheat, corn, oats and rye shipped in these four months to about $22,000,000 or to $53,000,000 less than the increase in the value of the grain shipped as measured by the average advance in prices.

These figures, however, give a very inadequate idea of the benefits the farmers will derive from good and adequate railway service throughout the crop year. They are based merely on the average increases in grain prices throughout this entire period over the prices of June 2. The price of wheat on October 7 was 40 cents more than on June 2, that of oats 9 cents more, that of corn 35 cents more and that of rye 64 cents more. Each of these increases in price is much greater than the average increases in prices for the last four months upon which our computations are based. A large part of the country's grain crop still remains to be shipped. The railways will continue to give record-breaking service in handling it, and if the present or higher prices prevail the benefit the farmers will derive from good transportation service in future months will be relatively much greater than the benefit they have derived from it during the last four months. Furthermore, only two-thirds of the wheat and only a comparatively small part of the corn produced are shipped out of the county in which they are grown. The kind of transportation service rendered has, however, a favorable or an unfavorable effect not only upon the prices received for the grain actually shipped by rail but upon all that is produced.

No other class of people in the United States are more dependent upon good railway service for their ability to take advantage of favorable market conditions and thereby make money than the grain farmers. If they cannot ship when market conditions are favorable they suffer vast losses. They did suffer vast losses from inadequacy of transportation in 1920 when the railways were just emerging from the chaotic conditions due to government control, and again in 1922 when transportation conditions were bad owing to a long period of poor earnings and the shop employees' strike. On the other hand, the grain farmers profit enormously when, as in 1924, transportation service is such that they can take advantage of favorable market conditions.

Nevertheless, no other class of people in the United States have voted so often as the grain farmers for candidates for public office who have advocated a policy of regulation which would cripple the railways and make the rendering of good and adequate transportation service impossible. They are being solicited for their votes at present by men such as LaFollette and Brookhart who are advocating the most

radical and destructive policy of regulation ever sponsored by any group of men in this country. We must await the election returns to determine whether good railway service which enables them to make money, or the voice of the demagogue advocating a policy of regulation which would be destructive of their welfare, has the greater influence with the grain farmers.

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

Charles Proteus Steinmetz—a Biography, by J. W. Hammond. Especially Chapter 21, "Steinmetz and Transportation," discussing Dr. Steinmetz's views as to the possibilities of railroad electrification. 490 p. Illus. Pub. by Century Co., New York. $4.00.

The New Graving Dock at Durban, Natal. Illustrated description of the new repair dock that South African Railways and Harbours expects to have completed this year. 31 p. Apply General Manager, South African Railways and Harbours, Johannesburg, South Africa.

Quantity of Wood Treated and Preservatives Used in the United States in 1923, by R. K. Helphenstibe, Jr. "Preservation of cross-ties," p. 16-20. 33 p. Issued by the U. S. Forest Service, Washington, D. C., in co-operation with the American Wood Preservers' Association.

Railroad Accounts and Statistics, by Charles E. Wermuth. "The primary object of this volume is to provide, in condensed form, a practical outline of present-day railroad accounting details and the description of their assembling to the completed financial statement." p. v. 349 p. Pub. by Prentice-Hall, New York. $4.00.

The Railroads as Factors in Business, by C. H. Markham. Pamphlet form of address printed in last week's *Railway Age.* 10 p. Publisher not given, but probably available from offices of Illinois Central, Chicago, Ill.

Railway Transportation: Principles and Point of View, by Sidney L. Miller. Author is Assistant Professor of Economics, University of Wisconsin, 905 p. Pub. by A. W. Shaw Co., Chicago, Ill. $4.00.

Periodical Articles

Developing Our Inland Waterways. In the "Pro and Con Discussion" section are discussions of various waterway-railway problems by Messrs. Ransdell and Binkerd, Thompson and Moulton, Culkins and Bureau of Railway Economics, J. H. Moore and C. H. Markham, Klein and Howard Elliott, Plummer and Kruttschnitt and others. Congressional Digest, September, 1924, whole issue.

The Development of the Electric Locomotive, by A. H. Armstrong. Illustrations and diagrams. Mechanical Engineering, October, 1924, p. 608-617.

Eliminating the Railroad Walking Delegate, by Franklin Snow. Contrasts B. & O. and Pennsylvania plans of employee co-operation. Commerce and Finance, October 1, 1924, p. 1887-1889.

Nyasaland's Transport Problem, by G. H. Lepper. Wherein is discussed a "railroad problem" somewhat different from our own. English Review, September, 1924, p. 450-458.

New Books

Coke and Its Uses. By E. W. L. Nicol, 134 pages, 6½ in. by 9½ in., bound in cloth. Published by D. Van Nostrand Company, New York. Price $5.00.

Because of the fact that existing steam boilers and furnaces as well as mechanical stokers, with a few exceptions of comparatively recent origin, have been designed upon a coal fuel basis it is conceded that coal is likely to remain the chief source of heat and power. The use of coke, however, has attracted much attention and in this book the author, who has had many years of specialized experience in adapting coal-fired steam boilers and other heating apparatus to the use of coke, has presented in non-technical language a practical treatise on coke production and its application as fuel not only to steam power plants and large steam generating units but to domestic use as well. The possibilities of the use of coke as fuel and the relative efficiency as compared with coal has been given a thorough discussion.

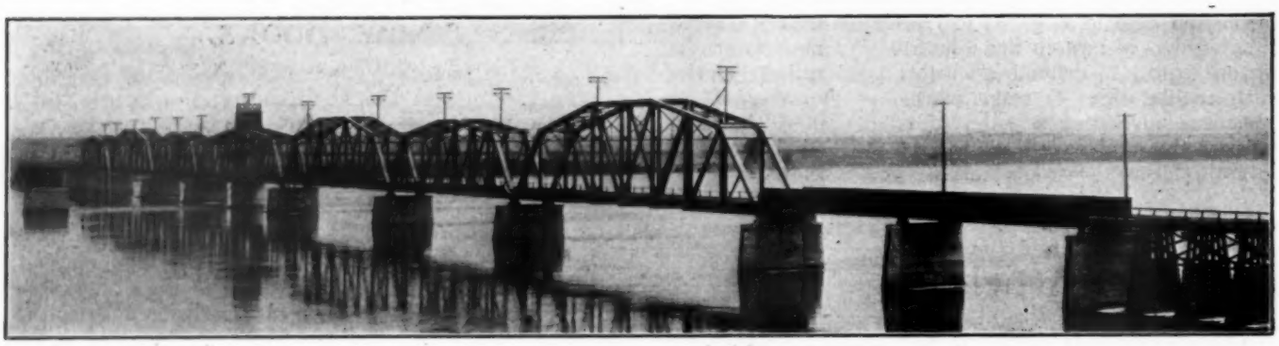
This volume contains 12 plates and 22 illustrations in the text showing the general arrangement as well as details of design of coke burning installations.

The Supervision and Maintenance of Steam Raising Plant. By Charles A. Suckan, 342 pages, 6½ in. by 9½ in., illustrated, bound in cloth. Published by D. Van Nostrand Company, New York. Price $8.00.

The present high cost of fuel is emphasizing the imperative need for an organized system of boiler house control. The fuel bill is the largest item of operating expense and any means of reducing it is worthy of the closest attention. In this book the author has brought out the necessity for the efficient operation and maintenance of steam generating plants and has presented such information as will assist power plant owners and engineers to operate their plants as efficiently as possible under existing conditions, in the simplest possible manner by avoiding a theoretical discussion of the subject. This volume will be found particularly valuable as a reference work. The text is divided into two general parts, the first dealing with supervision and the second with maintenance. A practical discussion of the economical use of fuels and the use of fuel saving devices is followed by a discussion of the operation of auxiliaries and the handling of fuel and ashes. A section of Part I is devoted to the management and duties of the power plant operating staff. Part II covers the inspection and maintenance of boilers, brickwork, auxiliary appliances and pipe lines. The text is supplemented with 250 illustrations and 6 tables.

Elasticity and Strength, Section Five, Economic Theory of Steel Railroad Bridge Design. By C. A. P. Turner, consulting engineer, Minneapolis, Minn. Illustrated, 129 pages, 6 in. by 9 in. Bound in cloth. Published by the author. Price $5.

This book comprises a presentation of the author's personal ideas on the general principles governing the design of steel railway bridges. The treatment of the subject presumes a knowledge of the mechanics of structures on the part of the reader and enters directly into a discussion of loadings, proportions, the relative merits of different types of structures, etc. The author has assumed the role of the iconoclast and frankly criticizes many of the established practices in bridge design and construction. He also advocates marked departures from present practice, such as the use of lubricated sliding plates instead of roller nests, unusually long panel lengths and continuous construction for floor stringers. While a reading of the book may not lead to the conviction that the author is right it will have a wholesome effect in arousing the reader from an attitude of complacent acceptance of established standards without critical analysis.



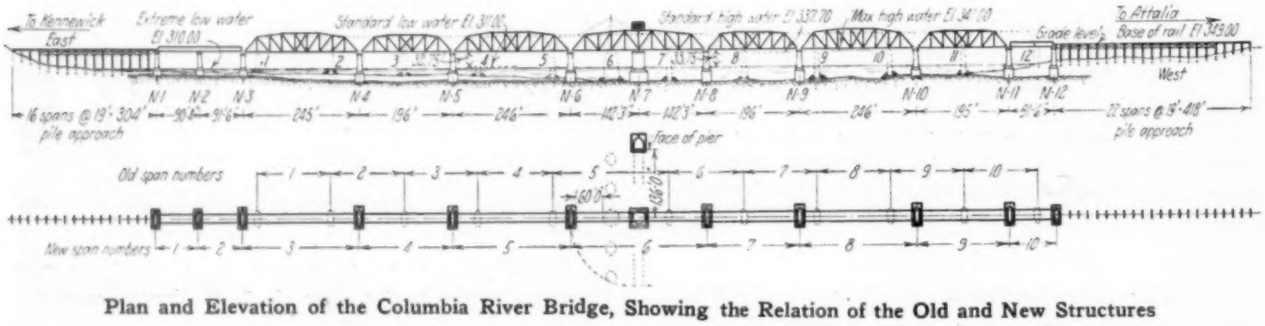
View of the Columbia River Bridge from the East End

Erecting Seven Simple Spans Without Falsework

Union Pacific Replaces Howe Trusses in Columbia River Bridge in an Interesting Manner

THE UNION PACIFIC has recently completed the erection of a new superstructure and the removal of the old piers as the last step in the complete reconstruction of its bridge over the Columbia river near Kennewick, Wash. The work on the substructure of this bridge involved a number of special problems which were reviewed in an article describing the pier construction which was published in the *Railway Age* of May 26, 1923. Certain conditions imposed in the renewal of the superstructure also called for the development of methods that warrant a detailed description and the article which follows refers to these.

The new bridge consists of three 192-ft. through trusses, three 242-ft. through trusses, three 90-ft. through plate girders, a 280-ft. center bearing swing span, a 304-ft. trestle approach on the east end and a 418-ft. trestle approach on the west end. It replaced an old structure consisting of pile trestle approaches, nine 150-ft. through Howe trusses and one 240-ft. Howe truss draw span.



Plan and Elevation of the Columbia River Bridge, Showing the Relation of the Old and New Structures

The new pile trestle approaches consist of 19-ft. spans with seven creosoted Oregon fir piles in each bent, the bents being sheathed with 3-in. by 12-in. planking and the chords made up of three 10-in. by 22-in. stringers in 38-ft. lengths so as to extend over two panels. The approaches were completed before the receipt of new steel.

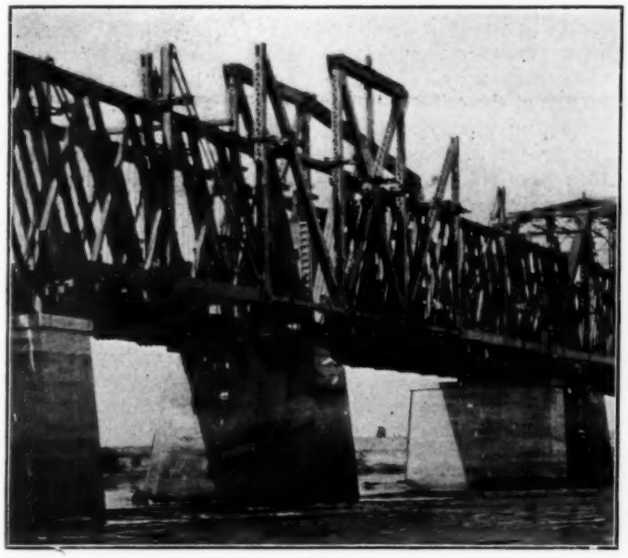
The Bridge Was Taken Out of Service

For some time before and during the construction of this bridge, traffic was diverted over another bridge and this bridge was not in use. With this advantage and on account of the depth of the water (about 30-ft. minimum in the channel), the velocity of the current, the high river stage prevailing at flood season (which is about 20 ft. above low water), and the fact that the bottom of the river in the channel at this crossing is rock overlaid with only a thin layer of blue clay, it was decided to use the old trusses in their original location to carry the new steel rather than put in falsework.

As the new bridge was to be on the same center line and with the base of rail at the same elevation as in the old bridge, it was decided to erect the new spans with one truss on the outside and the other between the old Howe trusses, as shown in the pictures. The outside truss was carried on outriggers consisting of two 14-in. by 28-in. stringers salvaged from the old trestle approaches. These were placed on top of the old bottom chords and extended out about six feet beyond the old truss at each panel point of the new steel as can be seen in one of the photographs. On account of the condition of the timber in the bottom chords of the trusses, which carried the excess load, it was necessary to reinforce them in the panels in which outriggers were located in order to take care of the additional unit stress due to bending.

The erection procedure was as follows: The old trusses were lowered two feet and the outriggers were installed at new steel panel points, while 6-in. by 12-in. timbers were bolted to the top chord, as is shown in pictures, to hold the web members until the top chord sections were placed. The top lateral systems of the old spans were removed and in lieu of these a sufficient number of 8-in. by 16-in. sticks were laid across the tops of the old trusses and bolted to the chords at such points as would not interfere with erection.

As the maximum load on the old trusses did not always come at the same relative position on the different spans, it was difficult to determine how much to allow for deflection for setting camber blocking. This was taken care of by



Erection Progress View, Showing How the New Steel Trusses Were Carried by the Old Wooden Spans with the Aid of Outriggers

setting the new steel on pairs of tapered steel wedges 8-in. wide. These wedges could be drawn up by means of 1¼-in. rods with long threads, thereby raising any low points to give proper camber.

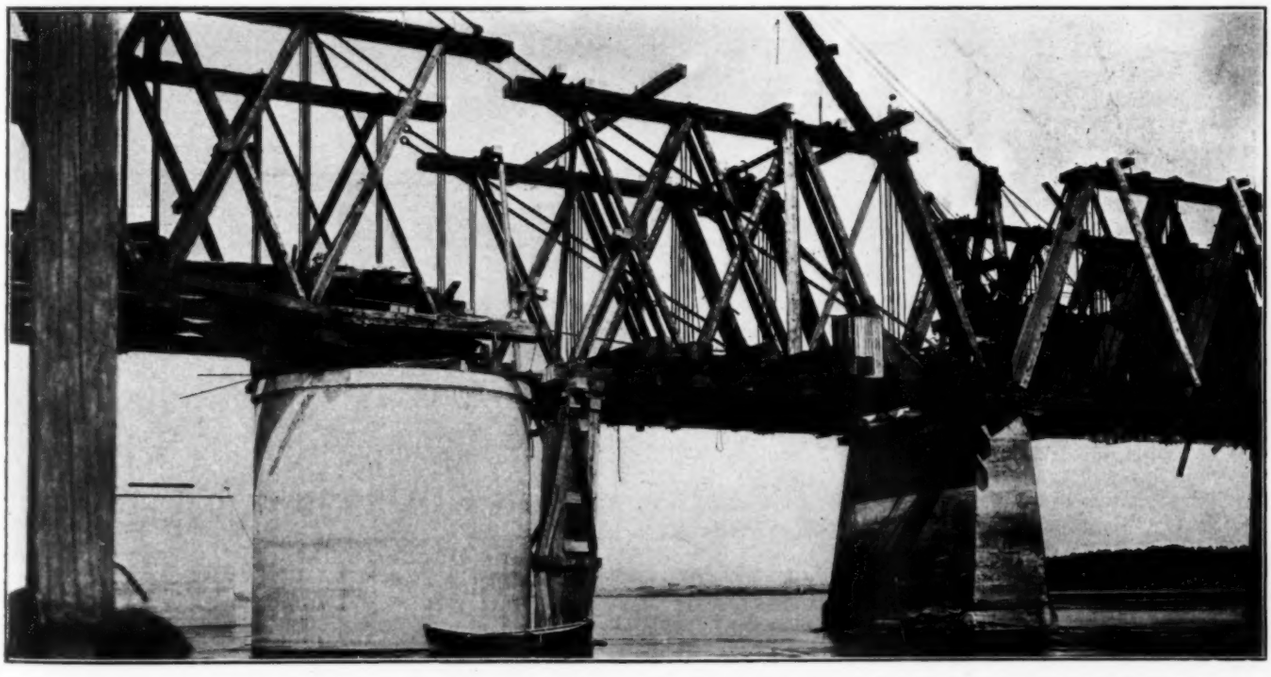
The order of placing the new steel was as follows: The girders for the 90-ft. span on the west end were unloaded at the pier sites, being set between and next to the old trusses of old Span 10, the latter having been revised and then cut to form a seven-panel span between old Pier 11 and new Pier 11. The floor system in the portion of the old span overlapping the new girder span was removed and the trusses were then spread far enough apart to allow girders to be placed in a permanent position except for elevation. The new floor system was put in with a derrick car, the track was laid and connected up with a run-off at the east end to connect with the track on the old spans. The severed portion of the old trusses was then picked up by a derrick car and a locomotive crane and carried out.

The erection of new trusses then followed in the following order: Lower chords, web members, top chords and top laterals. The members for the inside truss were set first in each span. Upon the completion of the erection of the trusses of the three spans west of the draw, one derrick started at the west end, backing up and removing the old floor, followed by a locomotive crane putting in the new floor system. As the old floor was removed the 14-in. by 28-in. outriggers which had been used for supporting the outside steel truss were removed and placed below the bottom chords of the old Howe truss and lashed to the new steel at the new steel panel points for the purpose of supporting the old trusses as they were dismantled.

After the complete erection of these three spans, the trusses of old Span 6 were cut over Pier N-8 and that portion of the old Howe truss Span 6 overlapping the east end of the new truss was removed. Then the other inside Howe trusses were removed and the new steel spans were lowered to grade and jacked into place.

The three truss spans on the opposite side of the draw were erected in a like manner. Three panels of the old draw fouled Span 5 and it was necessary to revise the draw by refastening the ends of the hog-rods of the draw span back three panels and removing those panels, compensating for the loss in weight in the one arm by means of a counter weight.

As it was necessary to handle the draw erection so as to maintain a 60-ft. channel open for boats at all times, the old draw was also cut off at the new pivot pier and counter weights were placed on the short arm to balance. The por-



The Falsework for the West Arm of New Draw, Showing a Portion of the West Arm of the Old Draw, Cut Off, Trusses Spread and Lowered

tion cut off was then lowered with the trusses spread apart, the east end being supported on a bent set on the footings of the new pivot pier as seen in one of the views. In a similar manner that portion of the old span between old Pier 7 and new Pier 8 was also lowered and spread. These were used as falsework for erecting the west arm of the new draw.

Following this, the remaining portion of the old draw was then taken out, first removing the floor system and then dropping the trusses into the river, after which the east arm of the new draw span was erected as a cantilever, being blocked up on the old pivot pier when that was reached to keep the new span from tipping. The steel for this span was received on September 29 and the bridge was placed in operation for trains on October 13.

Had to Remove Old Piers

Under the terms of the government permit the railroad was required to remove Piers 5, 6 and 7 in the channel and the four rock crib draw rests to the bottom of the river, 28 ft. below low water and the remaining piers from 10 ft. to 16 ft. below low water. The work of removing the portions of the old piers above the water surface presented no difficulties but the poor quality of the concrete and the fact that a number of them were located close to the new piers made the work of removing the pier shafts under water more difficult.

The West Truss Span as Seen from the Adjacent Girder Span. The Old Howe Trusses Are Still in Place and the New Floor System Has Not Been Installed

After removing the piers to about the water surface and dredging away the riprap from the sides, holes 1⅝ in. in diameter and about 48 in. apart were drilled to the bottom of the remaining portions of the channel piers. Drills 28 ft. long were used successfully with the Denver Rock Drill Company's "Clipper 50" drill. Most of the piers were of such structure as to be very difficult drilling, requiring a casing to prevent pebbles and sand caving in the holes and fouling the drills. The holes were loaded with about 1½ lb. of 60 per cent gelatin per cubic yard of concrete, with two No. 8 electric submarine caps to each hole, and all shots were fired simultaneously by means of current from an electric power line. The explosion usually caused such fragmentation that the broken concrete was easily dredged with a 1½-cu. yd. orange-peel bucket. The approximate amount of concrete and riprap removed was 13,000 cu. yd.

The old draw rests consisted of four hexagon cribs, each side of which was about 20 ft. long, made of 10-in. by 10-in. timber and filled with one-man rock. After removing the cribs to water level and dredging all of the loose rock from around the outside of them, a diver placed cartridges, each made up of 25 lb. of 60 per cent gelatin, around the bottom of the cribs at intervals of about five feet. Cartridges were also placed at various places between the timbers at intervals of 3, 8 and 15 ft. above the bottom, and all charges then fired simultaneously. This explosion cleared out most of the timber and loosened up the rock so that material could be dredged to the bottom of the river.

The principal equipment for the construction of this bridge consisted of a 35-ton locomotive crane, a 25-ton derrick car, a 15-ton dinky locomotive, a 270-cu. ft. air compressor and a barge 30 ft. by 65 ft., equipped with a derrick and an orange-peel bucket for dredging. The locomotive crane was used principally for loading and unloading steel and for changing the floor. The dinky delivered steel from the locomotive crane to the derrick car on the bridge.

The structural steel amounted to 2,716.55 tons, fabricated by the American Bridge Company. The work in the field was done by the railroad company forces under the direction of the engineering department of the Union Pacific System.

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Suggestions for Developing Co-operation

Officer in Charge of Personnel Must Secure Enthusiastic Support of Officers and Employees

By Allyn B. Tunis
Agent, Public Relations Department, Chesapeake & Ohio

[*From the many contributions to the* RAILWAY AGE'S *Contest on Co-operation, a number of papers, of which the following is one, in addition to those for which prizes were awarded, were selected as worthy of publication because of their able expression of the widely varying points of view on the solution of this important problem. Some of these papers have already appeared in these pages. Others will follow.*—EDITOR.]

FRIENDLY CO-OPERATION between management and employees generally is recognized as vitally important to the success of any business enterprise. That railroad which earnestly desires improvement in its relations with its men can produce results by proving its sincerity through a practical demonstration of a desire and willingness to be helpful.

To promote and encourage that much-to-be-desired quality—better relations between employer and employee—the first and most important aspect is the matter of wages. There never will be concurrent effort from any group of wage earners who are dissatisfied with their pay. Therefore, before considering the matter of ways and means of producing closer co-operation between employer and employee we must be certain that the latter is satisfied with his earnings.

Kinks Which Must Be Straightened Out

Few employees are in close touch with a railroad's officers. They hear much talk about co-operation, and very often they have sound reason to stamp it as insincere. When shopmen have poor tools with which to work, they cannot give their company the best that is in them. Absence of proper eating and sleeping quarters at the end of a run certainly will put a train crew in a resentful mood. Faulty dispatching and bad-order equipment are calculated to delay runs. When a schedule fails for reasons of this kind and a crew is called on the carpet as a result, the trainmen naturally think this a queer form of co-operation. These are just a few of the kinks which must be straightened out in the effort to convince employees of the management's sincerity in seeking to promote better relations. Indeed, any corporation seeking improvement in *esprit de corps* should move carefully in order not to be misunderstood.

It is of the utmost importance that the employees be convinced of the management's sincerity. Besides practical demonstration, there must be inaugurated a campaign of education, conducted through the liberal use of printer's ink and employee meetings. No progress with an undertaking of this sort really can be made until all officers actually feel what they say when they talk of co-operation. Employees are skeptical and suspicious of words; only sincere, tangible action will convince them of any management's intent to lend a helping hand.

Attention also must be given living and working conditions surrounding the employee. When he is well-fed and well-housed, and, of course, well-paid, an individual is in a receptive mood to enter into a movement for co-operation with his employer.

All Americans like a square deal and fair play, and this has a direct bearing on the matter of railroad discipline. Fair treatment must prevail at all times. It is incumbent upon the management to inaugurate and maintain, with complete impartiality, a set of uniform rules governing all phases of good and bad work and conduct. Also of paramount interest is the matter of the employee's protection against accidents, sickness, old age and death. Sick benefits, pensions, bonuses, savings, group insurance, stock purchase plans and similar pecuniary assistance play a large part in employee welfare work.

Physical condition of employees should enter consideration, because a man who is sound physically usually is sound mentally. Normal men, as a rule meet overtures half-way.

All of these and other activities which directly touch the employee must be co-ordinated and made interdependent if the wish to raise the standard of morale on a railroad is to be fulfilled. It is a pretty big order, but it can be done.

Officer in Charge of Personnel

At the outset, the most difficult and the most essential thing to be done is to select an executive who is big enough to take charge of the inauguration, organization and maintenance of these allied activities. The plan of any railroad to improve personal relations with its men will be no stronger than the official to whom this task is assigned. The officer in charge must be of a type with commanding personality, possessing all the qualities of a disciplinarian, tempered by the milk of human kindness and governed by the fear of God. He must be a capable executive of the highest rank, able to meet, talk and act with those in high authority and low position. Patience is an essential virtue in the make-up of this individual, and he must be without bias or prejudice. As a judge of men—of human nature—he should be *par excellence*. A genial disposition is desirable, but might be sacrificed for experience. Really, the qualifications of this man are so important that too much stress cannot be laid upon them.

The officer who takes charge of personnel should report to the president, and it should be his duty to co-ordinate all welfare work under his supervision and pick the subordinate heads of departments. It will be no small part of his job to sell co-operation, not only to the employees, but to brother officials as well. He often will find executives in his own organization who must be convinced time and again that it takes two to co-operate.

Hiring and Firing

Probably the most important feature of this work, after the matter of wages, is that of employment, which should be under the direction of a trained supervisor. No man or woman should be hired or fired by any head of department without reference of the case to the division of employment. This is calculated to reduce labor turnover by keeping out undesirables—the mentally, morally and physically unfit. This arrangement also will prevent capable, loyal employees who can not get along satisfactorily with their bosses from being lost to the railroad by placing them in jobs elsewhere on the system. Organization of employment work on this basis will tend to fit the round pegs into the round holes—put men and women where they can apply their talents best.

I do not know of a more practical, concrete way in which a railroad can take care of its people better than this.

In conjunction with employment, there should be maintained an office in which would be kept the service record of each employee, and thereon should be noted a complete history of the individual—date of birth, date of employment, dates of promotion, transfers, leaves-of-absence, and so on. In addition, the service record should contain the employee's qualifications other than those exercises in the performance of present duties. This would insure at all times a wide variety of material on which to draw when new jobs are to be filled, and would often provide promotions for individuals who otherwise probably would remain in a rut until finally dropped from the payroll. Service records should embrace comprehensive data showing the individual's preferences in athletics, sports and social amusements. This data is valuable in working out health and recreation programs.

Health and Recreation

A definite program covering health and recreation should be started and taken care of under the guidance of an individual who has been trained in this character of work. It is particularly important to enlist the interest and support of the employee's family in this work, and attention should be paid the matter of living quarters for both old and new workers.

The medical or hospital department should embrace the direction of all physicians and surgeons, the system of caring for the sick and injured and the duty of passing on the physical condition of persons seeking employment. Proper exceptions, of course, should be made and physical examinations waived in filling certain positions. In many cases, however, it is important that only mentally and physically alert persons be employed.

Employees and Welfare Work

There is a wide variety of special pecuniary rewards in use by the several railways as a means of aiding and protecting faithful employees and a branch of welfare work should be extended to handle these financial relations.

I will not attempt to recommend one plan in preference to another, but in passing would lay emphasis on the necessity of the management keeping in mind the rights and obligations of the employee. An individual has a right to choose what provisions he will make for his welfare and protection and that of his family, and he may be expected to look askance at anything undertaken by a company that does not appear fully to recognize his personal rights in such matters. I should say that the thing for the management to do is to find out what its employees need and then assist them to get it. Whatever plan agreed upon should come from co-operative, not arbitrary methods.

Safety work, which has played such an important part in the life of every railroad man, for the sake of greater co-operation and yet closer contact with employees, should be grouped with other affairs of personal relationship. I hope that the suggestion of placing safety departments in this position will commend itself to all roads which go in for intensive employee welfare work, because I am convinced that it will assist materially in producing yet better results in the way of accident-prevention, a condition to be sought by both employers and employees.

Employees' magazines have demonstrated their usefulness in putting information before the people on the payrolls. Through the magazine employees may be educated to the aims of the management and be kept informed of the rewards and protection for faithful service.

All publicity material furnished the daily, weekly and trade press should be prepared and sent out by a department also under the supervision of the officer in charge of personnel. It is just as important for a railroad to keep the public informed of what it is doing to assist its employees as it is to educate the latter that their welfare is a prime consideration with the company. When the public understands that a railroad is taking good care of its employees it will re-act favorably on the theory that a railroad which takes good care of its own people will take good care of its patrons. The publicity value of employee welfare work is indisputable, and for that reason it is closely tied with public relations.

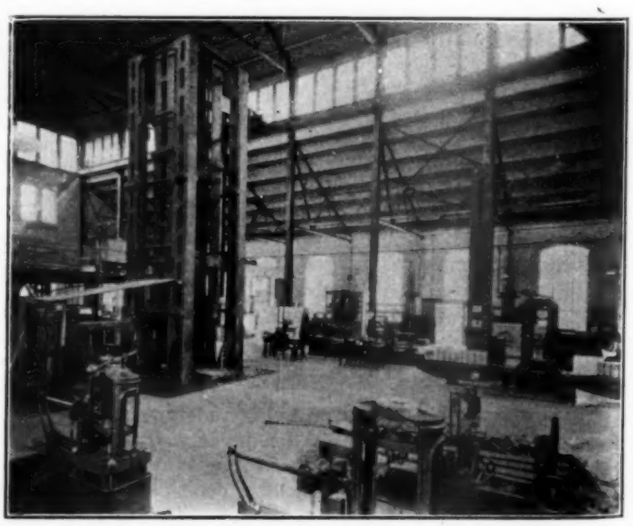
Co-ordination of Departments

It will be noted that the program I suggest calls for the co-ordination of departments rather than creation of new departments. And this is an economical thing to do, because it will reduce a great deal of lost motion which is observed on some railroads at present. I have made no attempt to describe the functions of the several units composing the activities under the officer in charge of personnel, because the *modus operandi* had best be left in his hands. I have tried to point out some of the things which are of fundamental importance. A capable officer in charge of personnel will recognize the importance of uniform regulations governing wages, employment, discipline and grievances, but he will be compelled to depend upon practically every other official, especially upon division superintendents, if he is to be successful in carrying out the plan.

The task before the officer in charge of personnel will not be easy. He must have the enthusiastic support of all officials and employees. He must see that there are meetings, lots of meetings of employees, and all officials should talk to the men—not like parrots, they must *feel* what they say. Superintendents, trainmasters and road foremen of engines should never let a day go by without getting in touch with some of their men. That division or section on which the superintendent or foreman knows all the men by their first names usually is the division or section on which the best work is done.

The officer in charge of personnel must plant and cultivate the seed and spirit of co-operation. He must convince the employees of the company's sincerity in regard to their welfare and comfort, and he must convince his colleagues that his work is for the best interest of the management and men alike.

This man will not have a sinecure, but the one with the proper qualifications will be worth his weight in gold to any railroad.



Engineering Laboratory, Lehigh University

Tests of Decapod Show 14 Per Cent Fuel Saving

Latest Pennsylvania Class I1s Locomotives Show Expected Economy with Short Cut-off

SINCE 1916 THE PENNSYLVANIA has placed in service 598 of the Decapod or 2-10-0 type, class I1s locomotives. This type has been developed to handle heavy, slow freight traffic and is built with cylinders working at a maximum cut-off of 50 per cent. The first of this type, No. 790, was given thorough tests which were described in the

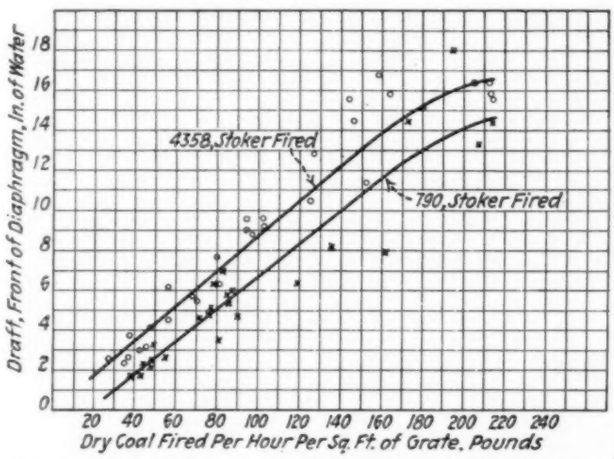


Fig. 1—Comparison of the Draft in Front of the Diaphragm, on Locomotives With and Without Feedwater Heaters

Railway Age for April 2, 1920, page 1097. After this first locomotive had been tried out in the test plant, 122 more were built and in August, 1922, and January, 1923, orders were placed with the Baldwin Locomotive Works for a total of 475 additional locomotives of the same class. Except for a few changes, the principal ones being the addition of a

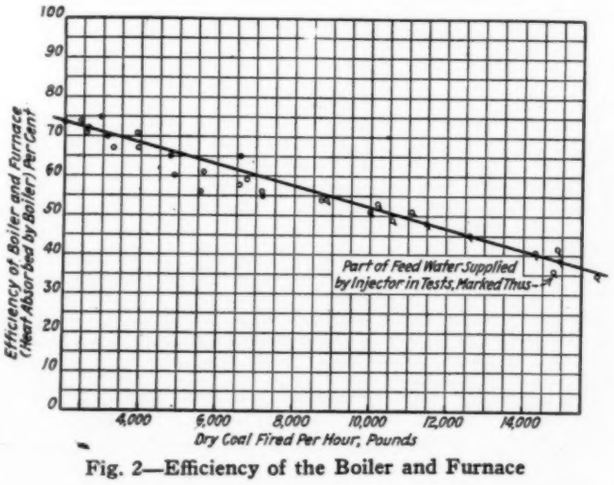

Efficiency of Boiler and Furnace (Heat Absorbed by Boiler) Per Cent
Part of Feed Water Supplied by Injector in Tests, Marked Thus
Dry Coal Fired Per Hour, Pounds

Fig. 2—Efficiency of the Boiler and Furnace

feedwater heater and a Type E superheater instead of a Type A, the last 475 locomotives are similiar to those of the class I1s previously built.

It is interesting to note that the addition of the feedwater heater has resulted in a material coal saving and that the performance of the engines of these last locomotives confirms the results of the tests of the earlier class I1s and show the expected economy when compared with long cut-off engines.

The results of these test plant trials are given in detail in Bulletin No. 32 (copyright 1924 by the Pennsylvania Railroad) from which the information in this article has been secured.

Locomotive No. 4358, selected for these tests, was built in January, 1923, and had been in service for about one month before being put on the testing plant. The principal dimensions of locomotive No. 4358, used in these tests and of No. 790 used in the tests previously described are shown in the following table together with similar dimensions of the L1s Mikado type freight locomotive used on the Pennsylvania:

GENERAL DIMENSIONS OF LOCOMOTIVES OF THE I1s AND L1s CLASSES

	I1s	I1s	L1s
Class	I1s	I1s	L1s
Type	2–10–0	2–10–0	2–8–2
Number	4358	790	1752
Year built	1923	1918	1914
Weight in working order, lb.	386,100	371,000	320,700
Weight on drivers, lb.	352,500	341,000	240,200
Weight of engine and tender in working order, lb.	590,900	575,700	497,050
Tractive force (calculated) lb.	*90,024	*90,024	x61,465
Tractive force per lb. m. e. p.	480	480	353
Driving wheels, diameter, in.	62	62	62

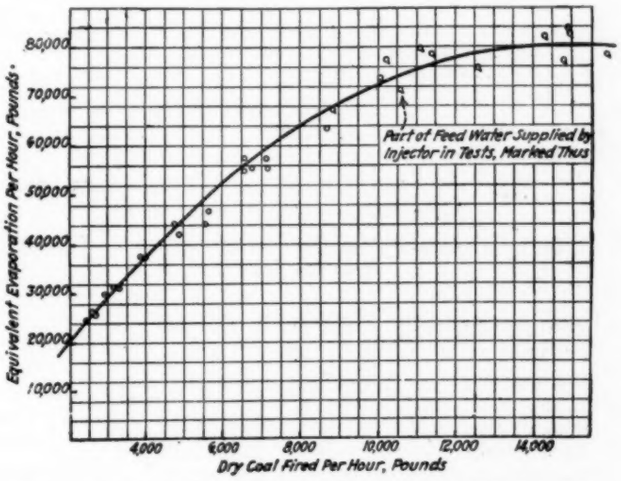

Equivalent Evaporation Per Hour, Pounds
Part of Feed Water Supplied by Injector in Tests, Marked Thus
Dry Coal Fired Per Hour, Pounds

Fig. 3—Rate of Combustion and Equivalent Evaporation

Wheel base, driving, ft. and in.	22–8	22–8	17–½
Wheel base, total, ft. and in.	32–2	32–2	36–4½
Wheel base, engine and tender, ft. and in.	73–½	73–½	73–3½
Cylinders (simple) diameter and stroke, in.	30½ x 32	30½ x 32	27 x 30
Valves (piston) diameter, in.	12	12	12
Valve motion, type	Walschaert	Walschaert	Walschaert
Boiler pressure, lb. per sq. in.	250	250	205
Firebox, type	Belpaire	Belpaire	Belpaire
Grate area, sq. ft.	70	70	70
Small flues, number	114	244	236
Small flues (outside diameter) in.	2.25	2.25	2.25
Large flues (for superheater) number	200	48	40
Large flues (cutside diameter) in.	5.25	5.5	5.5
Flues, length, in.	228	228	228
Heating surface, flues, sq. ft. (fireside)	4104	3667	3373
Heating surface, firebox (fireside) (including arch pipes) sq. ft.	287	287	305
Evaporative heating surface (fireside) sq. ft.	4391	3954	3678
Superheating surface (fireside) sq. ft.	2410	1460	1215
Heating surface, total (fireside) sq. ft.	6801	5414	4893
Feedwater heater (open type)	Worthington	None	None
Stoker	Duplex	Duplex	None
Ratio of weight on drivers to tractive force	3.9	3.8	3.9
Total heating surface to grate area	97.1	77.4	69.9
Flue surface to fire box surface	14.3	12.8	11.1
Superheating surface to evaporative heating surface	0.55	0.37	0.33

x Based on mean effective pressure, equal to 85 per cent boiler pressure.
* On account of limited cut-off, based on a mean effective pressure equal to 75 per cent of boiler pressure.

The boiler is of the extended wagon top type with Belpaire firebox, wide grate and a combustion chamber three

feet long. The working pressure is 250 lb. per sq. in. and to provide for this high pressure the barrel plates have been made 1¼ in. thick. It is equipped with a Duplex stoker, arranged so that the two elevators deliver their coal at alternate periods.

The boiler is fitted with the Superheater Company's Type E superheater in which there are 100 1-3/16-in., outside diameter, superheater elements, located in 200 3¼-in. boiler flues, each element making a single pass in each of two adjacent flues. There are 114, 2¼-in. flues in which there are no superheater elements. With this superheater the evaporative heating surface has been increased 11 per cent and the superheating surface 65 per cent over that of the earlier I1s boiler, which was fitted with a Type A superheater.

The details of the cylinders, valves and arrangement of steam and auxiliary ports are the same as in the earlier class I1s locomotive which has been described in a previous article. A new type crosshead having a single bar guide with five enclosed bearing surfaces is used on these latest Decapods.

This is the first class of locomotives on the Pennsylvania Railroad on which a feedwater heater is standard equipment.

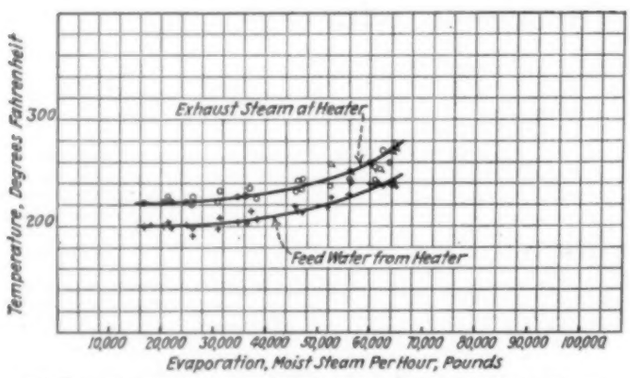

Temperature, Degrees Fahrenheit
300
200
Exhaust Steam at Heater
Feed Water from Heater
10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000 90,000 100,000
Evaporation, Moist Steam Per Hour, Pounds

Fig. 4—Temperatures of Exhaust Steam and Feed Water from the Heater

The heater is of the Worthington open type, in which the feed water is heated by mixture with the exhaust steam.

Coal Used in Tests

All the tests reported here were made with coal of one kind, from a single mine. This was a high volatile bituminous coal from the Crows Nest mine. It was in run of mine size and estimated to contain from 15 to 50 per cent lumps. This is the same kind of coal as used in tests of the earlier class I1s locomotive No. 790. A representative sample from a car used in the tests when analyzed, gave the following:

PROXIMATE ANALYSIS OF CROWS NEST COAL

Fixed carbon, per cent	57.84
Volatile matter, per cent	31.12
Moisture, per cent	0.66
Ash, per cent	10.38
	100.00
Sulphur, determined separately, per cent	1.73
Calorific value, dry coal, b.t.u.	13,658

Boiler Performance

Draft, Combustion and Temperature. This locomotive has the same size nozzle as the former I1s No. 790, but the tube arrangement is different and part of the exhaust steam does not pass through the nozzle but goes to the feedwater heater. Fig. 1 shows that, in general, the draft at the front of the diaphragm was higher than in locomotive No. 790.

The grate area of this locomotive is 70 sq. ft. Under normal conditions it is fired by a stoker, and the test results show that the maximum rate of firing was above 16,000 lb. per hr., equal to more than 200 lb. per sq. ft. of grate.

The drop in pressure between the boiler and steam chest, due to the friction of the steam passing through the Type E superheater, which has 100 units with a steam passage area of 70 sq. in., is found to be equal on the average to that through the Type A superheater, which has 48 units with an internal area of 54 sq. in.

The normal steam temperature due to the boiler pressure of 250 lb. is 406 deg. F., and in the regular tests the steam

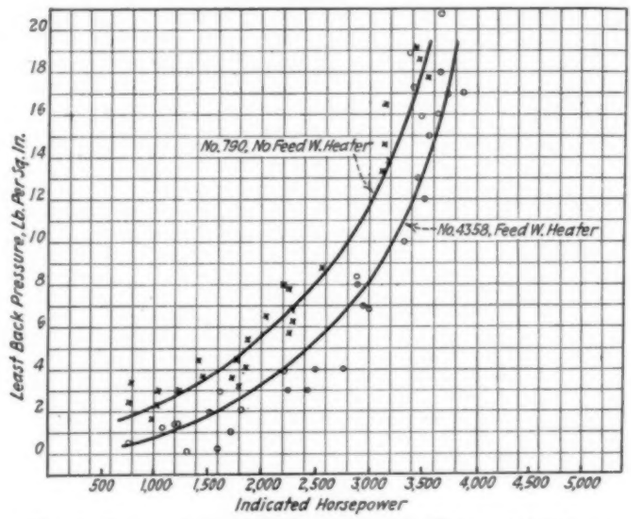

Least Back Pressure, Lb. Per Sq. In.
0 2 4 6 8 10 12 14 16 18 20
No. 790, No Feed W. Heater
No. 4358, Feed W. Heater
500 1,000 1,500 2,000 2,500 3,000 3,500 4,000 4,500 5,000
Indicated Horsepower

Fig. 5—Comparison of Back Pressures With and Without Feedwater Heater

temperature ranged between 506 and 671 deg. The steam temperature increased rapidly, with the increase in coal fired, up to a rate of about 160 lb. per sq. ft. of grate per hour, after which a greater rate of firing produced little or no increase in steam temperature. When compared with the earlier class I1s locomotive the superheat temperatures are

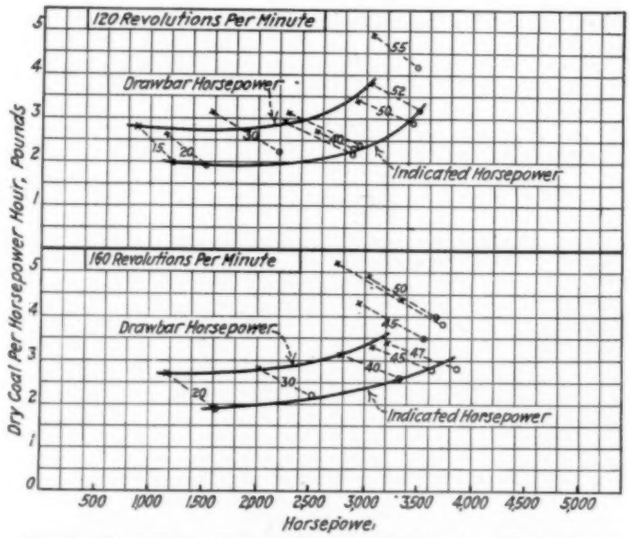


Fig. 6—Coal Rates Per Indicated and Drawbar Horsepower

alike for the two locomotives, when worked at the same rate of combustion.

Evaporative Capacity. When the first tests were made the locomotive had an exhaust nozzle 7⅜ in. in diameter with four projections. The net area of the nozzle was 40 sq. in., and with it the maximum equivalent evaporation was found to be 68,813 lb. In view of the evaporation of the earlier locomotive of this class, No. 790, this result was thought to

be low and the diameter of the exhaust nozzle was changed to 7 in. with four projections, making the net area of the nozzle 35.9 sq. in., equivalent to a 6¾ in. circle. With this 7-in. nozzle, in the only test where the boiler pressure was maintained, the maximum equivalent evaporation was 79,988 lb. per hr.

Locomotive 790 with the same size and type of exhaust nozzle and with a boiler very similar, except for a difference in the superheater and tube arrangement, shows a maximum equivalent evaporation of 82,735 lb. The maximum equivalent evaporation of locomotive 4358 was a little higher than

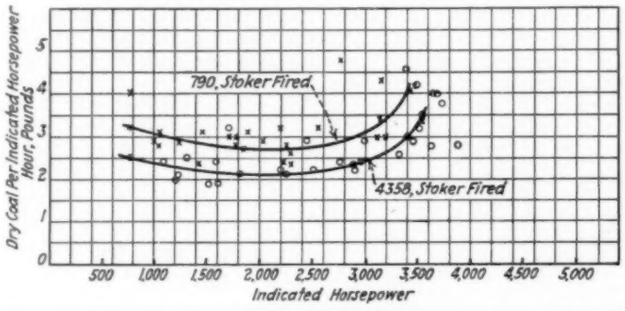


Fig. 7—Comparison of Coal Rates of Locomotives 790 and 4358, Showing Saving Effected by the Latter

that of locomotive 790, but, considering only the tests at which full steam pressure was maintained, the maximum evaporation of locomotive 790 was higher. The difference between all the maximum figures is only a few per cent and the capacity of the two boilers, not including the work of the feedwater heater, is approximately the same.

Fig. 2 shows that when locomotive 4358 is stoker fired the efficiency, which is as high as 75 per cent at low rates of evaporation, decreases as the rate of combustion increases until it is only 35 per cent when firing 16,000 lb. of coal per hour. This very low efficiency occurs only when the rate of firing is beyond the reasonable capacity of the boiler. Fig.

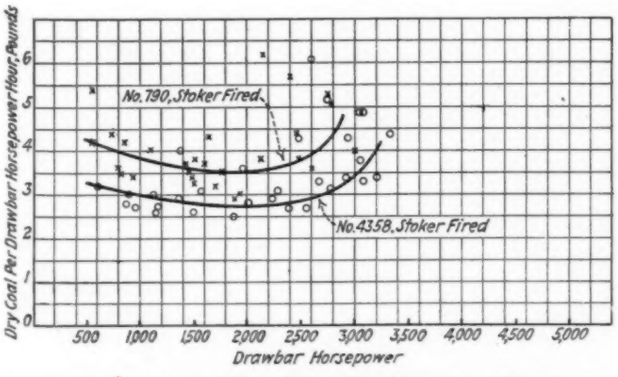


Fig. 8—Comparison of Coal Rates Per Drawbar Horsepower, Locomotives 790 and 4358

3 shows that practically the maximum evaporation of the boiler can be secured by firing 11,070 lb. of dry coal per hour, and when more coal is fired it is largely wasted as it results in only a slight increase in evaporation. It is interesting to note that at this rate of combustion, 159 lb. of dry coal per sq. ft. of grate per hour, the maximum steam temperature was obtained. The equivalent evaporation per pound of dry coal varies from about 10.5 lb. at low rates of evaporation, to between five and six lb. at the maximum capacity of the boiler.

The maximum figure for the equivalent evaporation per hr. per sq. ft. of heating surface reached was 12.3 lb., while the maximum figure for locomotive 790 was 15.3 lb. This difference is explained by the fact that while there is a large increase in the superheating surface of locomotive 4358 there was no corresponding increase in the maximum evaporation.

Feedwater Heater. The temperature of the water delivered by the heater depends upon the temperature of the exhaust steam, and this in general increases with the output of the locomotive. Fig. 4 shows the two temperatures at different rates of evaporation. The highest feedwater temperatures were reached when the locomotive was worked at a rate high enough to require the use of the injector to supplement the feedwater heater. During these tests the temperature and pressure of the exhaust steam were high, but the amount of water delivered by the feedwater heater was limited because part of the boiler feed water was supplied by the injector. The highest feed water temperature in any test where the injector was not used was 218 deg. F.

The direct saving, that is, the proportion of heat saved to the total output of boiler and heater, varied from 7.4 to 10.2 per cent in tests in which all the feed water was supplied by the heater. In road service a locomotive is seldom worked

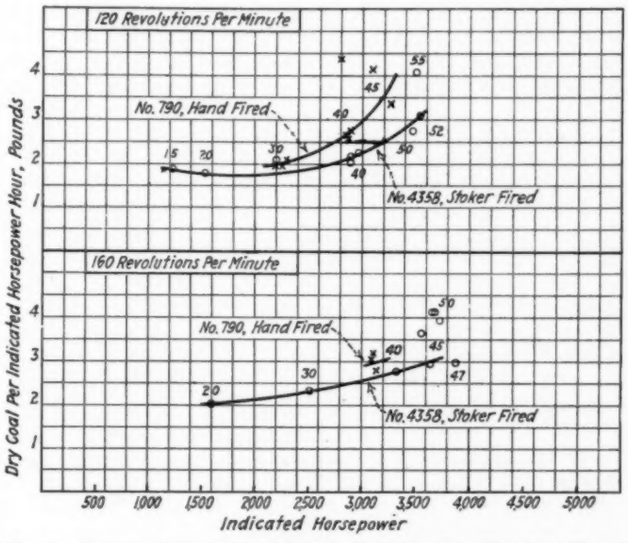

120 Revolutions Per Minute
No. 790, Hand Fired
No. 4358, Stoker Fired
160 Revolutions Per Minute
No. 790, Hand Fired
No. 4358, Stoker Fired
Dry Coal Per Indicated Horsepower Hour, Pounds
Indicated Horsepower

Fig. 9—Comparison of Coal Rates, Locomotive No. 790, Hand Fired with No. 4358, Stoker Fired

at a rate beyond the nominal capacity of the heater, but many of the tests on the plant were beyond this capacity. In these tests there is an increase in the temperature of the water delivered by the heater, but the direct saving due to the heater falls as low as 4.7 per cent because part of the boiler feed water is supplied by the injector.

The heater reduces the amount of water taken from the locomotive tender. The net saving in water by using the heater averages about 10 per cent when the locomotive is worked at rates within the capacity of the heater.

At a given rate of combustion the temperature of the steam from the superheater is not affected by the use of a heater, but as less coal is burned to develop a given indicated horsepower, the temperature of the steam is lower when the heater is used if a comparison is made at equal horsepowers.

In addition to the direct saving of the heater due to recovery of the exhaust steam from the locomotive, there is an indirect saving due to the fact that at a given horsepower the heater reduces the work of the boiler and, therefore, increases the boiler efficiency. In order to determine the total saving due to the use of the feedwater heater, eight tests with the heater, covering a range of evaporation up to its full capacity, were repeated, using the injector only to feed the boiler.

The average coal saving in the eight tests was 13.9 per

cent. In the eight tests made with the feedwater heater, the average temperature of the cold feed water was 9½ deg. F. lower than in the tests without the feedwater heater. This lower temperature increased the calculated saving of the feedwater heater but decreased the coal saving, when comparison is made with similar tests with the injector in use.

The heat recovered by the feedwater heater is a direct addition to the heat output of the boiler proper and the maximum steaming capacity of the locomotive is therefore increased in the same proportion. During the tests at or near maximum boiler capacity the heat recovered by the feedwater heater varies from 4.9 to 6.4 per cent of the heat output of the boiler proper, thereby increasing the maximum steaming capacity of the locomotive in the same proportion, an average of 6 per cent. The maximum heat output of the boiler and feedwater heater of locomotive 4358 was 85,580,584 b.t.u. per hr., an increase of 6.3 per cent over the maximum heat output of locomotive 790.

Engine Performance

The engines of this locomotive are of the limited cut-off type, and with the exception of the crossheads and piston rods, differ in no way from those of the former class I1s locomotive No. 790. The water rate which is 20.8 lb. at 40 r.p.m. and 20 per cent cut-off, has fallen to 15 lb. at 160

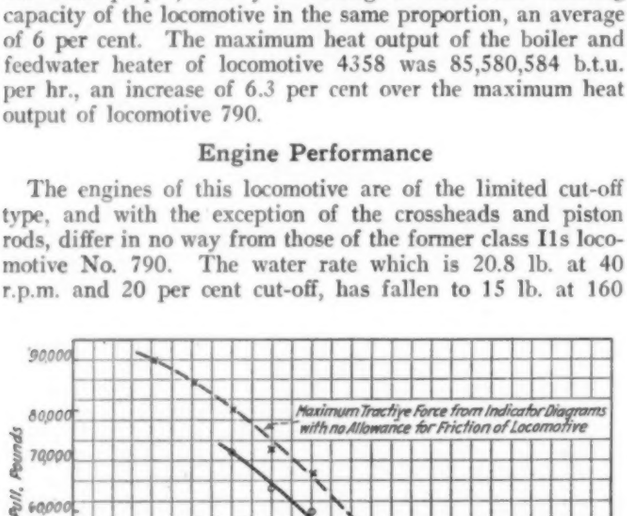

Drawbar Pull, Pounds
90,000
80,000
70,000
60,000
50,000
40,000
30,000
Maximum Tractive Force from Indicator Diagrams with no Allowance for Friction of Locomotive
Max. Pull at Drawbar from Tests with Longest Cut-Off and Full Pressure
20 40 60 80 100 120 140 160 180 200 220 240 260
Speed in Revolutions Per Minute

Fig. 10—Drawbar Pull at Various Speeds

r.p.m. and 30 per cent cut-off. At all speeds above 60 and below 180 r.p.m. the water rate lies between 17½ and 15 lb., except in a test at 120 r.p.m. and 55 per cent cut-off, where the steam pressure was not maintained because the maximum capacity of the boiler had been reached. This is a decided improvement over the performance of the L1s locomotive, where in 29 tests the water rate of only one was below 17½ lb. The lowest water rate of the I1s is obtained when the locomotive is developing between 2,100 and 2,500 i.h.p. at all speeds except 40 r.p.m., where the maximum horsepower was less than 2,100.

The feedwater heater reduced the temperature of the steam at a given horsepower and should adversely affect the water rate. On the other hand, the feedwater heater, by reducing the amount of steam going through the nozzle, reduces the back pressure and, therefore, decreases the water rate. Fig. 5 shows that the least back pressure of an I1s locomotive equipped with a feedwater heater is considerably lower than that of locomotive 790 without a feedwater heater, both locomotives being equipped with the same size nozzle. These two factors offset each other and the water rate of the two locomotives is found to be in practical agreement.

Locomotive Performance

The performance of the locomotive as a whole is gauged by the coal burned and drawbar horsepower developed, but comparisons are also made on the basis of indicated horsepower. All the coal and water used in the tests is charged against drawbar horsepower, but the amount chargeable to auxiliaries is not included in that charged against indicated horsepower.

At 40 r.p.m. (7.1 m.p.h.) the coal burned per i.hp. is nearly a uniform amount of 2½ lb. at all cut-offs except 55 per cent, and the coal per drawbar horsepower about 3 lb. At speeds of 40 and 80 r.p.m. (7.1 and 14.2 m.p.h.) the coal rate is shown to increase abruptly at cut-offs beyond 50 per

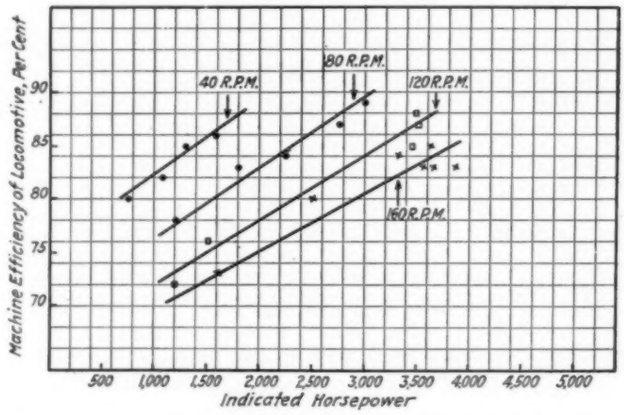


Fig. 11—Machine Efficiency Compared with Speed and Power Developed

cent. At speeds above 40 r.p.m. the coal rate per i.hp hour is close to 2 lb. at all rates of working up to 2,500 i.hp. Per drawbar horsepower, it is less than 3 lb. Two tests show a coal rate as low as 1.9 lb. per i.hp. hour, and approximately 2½ lb. per drawbar horsepower hour. Fig. 6 shows the coal rates per i.hp. hour at speeds of 120 and 160 r.p.m.

The coal per indicated and drawbar horsepower has been plotted in Figs. 7 and 8 to compare the performance of

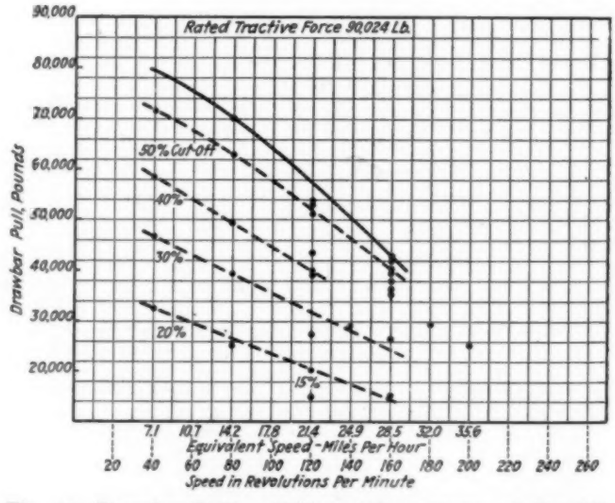


Fig. 12—Drawbar Pull at Different Percentages of Cut-Off

locomotive 4358 with that of 790 when both were stoker fired. The average improvement of locomotive 4358, equipped with a heater, is found to be more than 14 per cent, which is the total saving that can be credited to the feedwater heater. As there is no difference between the engines of the two locomotives, the additional fuel saving is that due to the better boiler efficiency.

In Fig. 9 the coal burned per i.hp. hour, is shown comparing locomotive 4358, stoker fired, with 790, hand fired,

at different speeds. The reason for making this comparison is that a full set of tests was made for locomotive 790 only hand fired and locomotive 4358 only stoker fired. It has not been possible to obtain as good economy with stoker firing as with hand firing and the charts are of interest in showing that, whatever economy has been lost by the introduction of the stoker, has been regained by the use of the feedwater heater.

The maximum indicated horsepower of locomotive 4358 was 3,863 and was developed at a speed of 160 r.p.m. and 47 per cent cut-off. By dividing the weight of the locomotive in working order, by this horsepower, it is found to weigh 100 lb. per horsepower. The class L1s locomotive weighs 113 lb. per horsepower at maximum rate.

While the average gain in efficiency of locomotive 4358 compared with locomotive 790 is quite large, the maximum increase in horsepower is only 9 per cent. Part of this increase is due to the lower water rate of locomotive 4358 in the particular tests under comparison. An increase in horsepower of 6.4 per cent is due to the increase in steaming capacity resulting from the heat saved by the feedwater heater. When the locomotive is operated at the maximum horsepower the injector is used to supply a large part of the feedwater and, therefore, the increase in power is less than 14 per cent, which is the percentage of saving due to the use of the feedwater heater only when the heater supplies all the feedwater.

In Fig. 10 are plotted some maximum drawbar pulls at different speeds. Except at 160 r.p.m., the points are not the averages for the regular tests, but were obtained by special short runs in which the boiler pressure was held at exactly 250 lb. At speeds below 60 r.p.m., the capacity of the dynamometer appeared to be exceeded and the figures for these runs were omitted.

The amount of steam furnished by the boiler at speeds below about 15 m.p.h., is not the limiting factor in establishing the maximum drawbar pull, as then only a moderate weight of steam is required. The drawbar pull at these speeds depends upon the dimensions of cylinders and driving wheels for any given boiler pressure.

Machine Efficiency—The machine efficiency of locomotive 4358 has a wide range, from 71 to 88 per cent. Over a long series of tests the variation in machine efficiency during duplicate tests is so wide that it is evident that the dynamometer readings are not always correct. In Fig. 11 is plotted the machine efficiency for all tests. The points in Fig. 11 are consistent, and while they may be too high or too low, they show that the machine efficiency follows a regular law decreasing with the speed and, at any given speed, increasing as the power developed is increased.

Conclusions

In the conclusion of the report on these tests it is stated that "the substitution of the Type E for the Type A superheater with the resultant large increase in heating surface has not noticeably increased the evaporative capacity or efficiency of the boiler; the addition of a feedwater heater has resulted in a coal saving of about 14 per cent."

THE CHICAGO ASSOCIATION OF COMMERCE, through its legislative, transportation and executive committees has joined the forces opposing the passage of the Howell-Barkley bill to abolish the Railroad Labor Board. Letters have been written to the representatives of Illinois in the Senate and the House, expressing the views of the association committees and declaring that the passage of the measure would be highly undesirable. Other railway legislation now pending before Congress has also been considered by the executive committee and the president was authorized to appoint a special committee to communicate with the various senators and representatives, advising them of the association's position on those measures.

Illinois Central Tentative Valuation

WASHINGTON, D. C.

THE INTERSTATE COMMERCE COMMISSION has issued a tentative valuation report on the properties of the Illinois Central and its dirtcely operated subsidiaries, as of June 30, 1915, placing the final value for rate-making purposes at $347,680,187 for the common-carrier property used and $216,869,187 for that owned. The final value of the property wholly owned and used is reported as $216,409,000; that of the leased property wholly used at $130,927,117, and that of the jointly used property at $344,070. The outstanding capitalization as of valuation date was $263,106,146, of which $109,293,446 was in common stock, $153,212,700 funded debt, and $600,000 non-negotiable debt to affiliated companies. The investment in road and equipment, including land, on date of valuation, was stated in the books as $155,063,785, which the report readjusts to $152,799,548. In addition to the carrier properties included in the final value the Illinois Central had investments in other companies, consisting principally of securities held for non-carrier purposes, of a par value of $130,589,305 and a book value, stated by the company as its net investment in other companies, of $115,813,723.

The report includes the valuation of the Chicago, St. Louis & New Orleans; Dubuque & Sioux City; Canton, Aberdeen & Nashville; South Chicago; Chicago & Illinois Southern; St. Louis, Belleville & Southern; Meridian, Brookhaven & Natchez; Bloomington Southern; Omaha Bridge & Terminal Railway; Blue Island, Fredonia & Leeds, and Johnson City Southern, all of which are controlled by the Illinois Central through ownership of 99 or 100 per cent of the stock. The mileage wholly owned was 2,251 miles of road; the property wholly used included 2,357 miles of road owned by other carriers, of which 21.274 miles were owned by the Mississippi Valley and 20.679 miles by the Louisville & Nashville on which separate reports are made.

The cost of reproduction new of the common carrier property other than land and materials and supplies is reported as $196,139,892 for the property owned and $322,514,050 for the property used, while the cost of reproduction less depreciation is reported as $147,365,286 and $250,954,823, respectively. The carrier lands owned, 37,558 acres, are given a present value of $57,323,705 and those used, 74,921 acres, a present value of $79,286,015. Non-carrier lands owned by the Illinois Central, 4,246 acres, are given a present value of $4,585,209 and the investment in miscellaneous physical property is recorded at $1,328,029. The company had $7,933,757 of cash on hand and materials and supplies but only $6,409,000 was held by the commission as necessary for working capital and included in the final value, while the remainder was classified as held for non-carrier purposes.

In referring to aids, gifts, grants, etc., the report says the company's returns stated that the net proceeds from sales of 2,588,831 acres of land grant lands amounted to $23,191,236 but that the profit and loss account of the company shows that the credits from land sales amounted to $26,185,959. The company reported that the value of concessions or allowances in consideration of grants of land from the United States government in the way of reduction of transportation charges paid for by the latter amounted to $4,604,490.

THE BALTIMORE & OHIO has filed with the State Road Commission of West Virginia a protest against the issuance of permits to certain applicants for authority to operate motor-buses between Buckhannon and Weston.

Some Commodities Have Record Loadings

WASHINGTON, D. C.

FREIGHT CAR LOADING again increased during the week ended September 27 to a total of 1,087,447 cars, which was a decrease compared with the corresponding week of last year of 10,046 cars and an increase of 109,656 cars as compared with 1922. While the loading was still slightly below that for last year, which was the highest on record, 1,097,493 cars, the loading of grain and grain products; merchandise, l.c.l.; and miscellaneous freight, all established new records. The loading of grain and grain products, 69,289 cars, was an increase of 18,404 cars as compared with last year. Merchandise, l.c.l., 258,458 cars, showed an increase of 5,238 cars as compared with last year, and miscellaneous freight 405,436 cars, showed an increase of 11,801 cars. All other classes of commodities showed decreases as compared with last year, are showing a reduction of 23,088 cars, and livestock showed a decrease as compared with the previous week. Loading in the Pocahontas, Southern, Central Western and Southwestern districts was heavier than that of last year. As compared with previous weeks, coal loading, 193,422 cars, showed the largest increase. The summary as compiled by the Car Service Division is given in the first column.

Week Ended September 27, 1924

Districts	1924	1923	1922
Eastern	250,392	257,644	236,901
Allegheny	216,153	224,171	209,240
Pocahontas	49,420	45,460	27,795
Southern	148,616	145,789	126,957
Northwestern	166,621	182,519	154,818
Central Western	178,721	168,626	158,296
Southwestern	77,524	73,284	63,784
Total Western districts	422,866	424,429	376,898
Commodities			
Grain and grain products	69,289	50,885	51,925
Livestock	36,871	41,101	39,799
Coal	193,422	200,955	187,812
Coke	9,391	12,936	9,453
Forest products	68,404	75,497	58,002
Ore	46,176	69,264	49,995
Mdse., l. c. l.	258,458	253,220	233,384
Miscellaneous	405,436	393,635	347,421
Total	1,087,447	1,097,493	977,791
September 20	1,076,553	1,060,811	961,138
September 13	1,061,424	1,060,563	937,221
September 6	920,979	928,916	823,247
August 30	1,020,339	1,092,150	923,806
Cumulative total, January 1 to date	35,703,014	37,303,239	31,301,098

Loading of revenue freight this year compared with the two previous years has been as follows:

	1924	1923	1922
4 Weeks of January	3,362,136	3,373,965	2,785,119
4 Weeks of February	3,617,432	3,361,599	3,027,886
5 Weeks of March	4,607,706	4,581,176	4,088,132
4 Weeks of April	3,499,210	3,764,266	2,863,416
5 Weeks of May	4,474,751	4,876,893	3,841,683
4 Weeks of June	3,625,472	4,047,603	3,414,031
4 Weeks of July	3,526,500	3,940,735	3,252,107
5 Weeks of August	4,843,404	5,209,219	4,335,327
Week of September 6	920,979	928,916	823,247
Week of September 13	1,061,424	1,060,563	937,221
Week of September 20	1,076,553	1,060,811	961,138
Week of September 27	1,087,447	1,097,493	971,791
Total	35,703,014	37,303,239	31,301,098

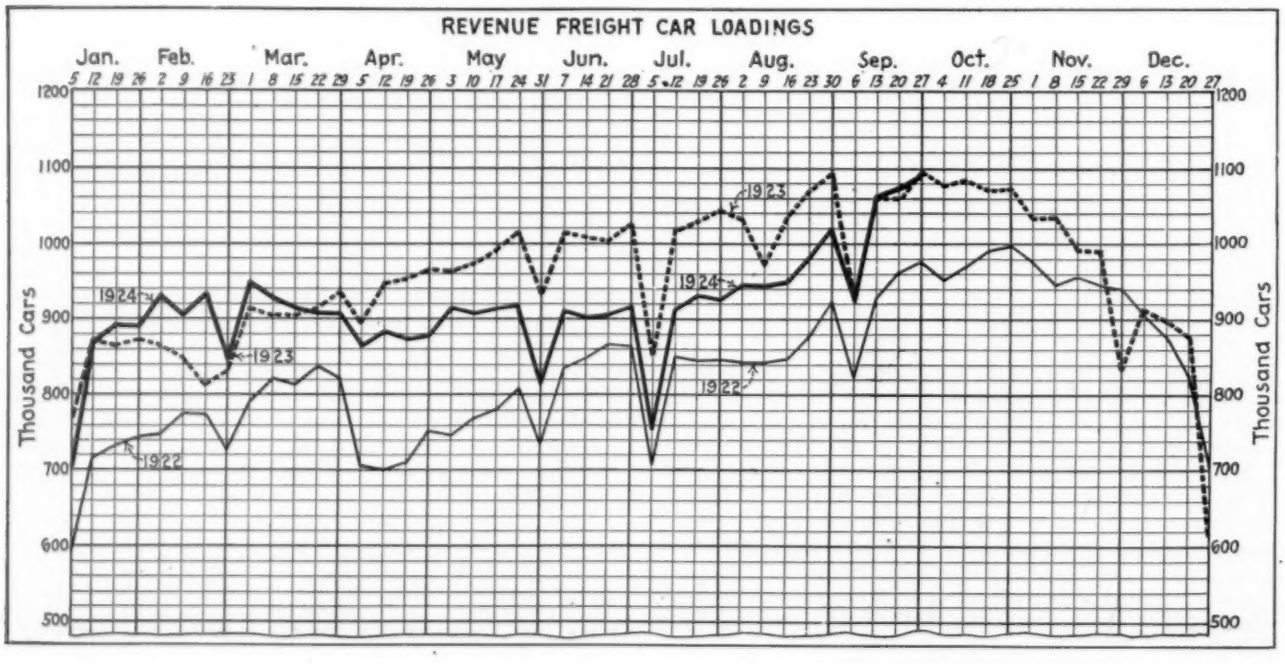
The freight car surplus was further reduced during the period September 15-22 to 143,345 cars, including 72,279 coal cars and 48,135 box cars. For the Canadian roads the surplus was 17,025 cars, including 14,200 box cars.

Car Loading in Canada

Revenue car loadings at stations in Canada for the week ended September 27 totalled 65,832 cars, an increase of 2,780 over the previous week. Grain loading in the Western division was up 4,187 cars and in the Eastern division 298 cars. Coal loading fell off 950 cars and there was also a decline of 604 cars in miscellaneous freight. Loadings, however, continue to be lighter than in 1923.

TOTAL FOR CANADA

Commodity	For the week ended 1924 Sept. 13 Cars	Sept. 20 Cars	Sept. 27 Cars
Grain and grain products	6,490	11,190	15,675
Live stock	2,589	2,776	2,599
Coal	6,061	7,000	6,050
Coke	256	204	218
Lumber	3,650	3,589	3,558
Pulpwood	1,522	1,557	1,391
Pulp and paper	2,019	1,960	1,870
Other forest products	1,974	2,197	2,035
Ore	1,547	1,260	1,690
Merchandise l. c. l.	15,624	16,049	16,080
Miscellaneous	13,782	15,270	14,666
Total cars loaded	55,514	63,052	65,832
Total cars received from connections	27,498	31,164	31,909
Total cars loaded for corresponding week, 1923	61,746	68,694	70,406
Cumulative loading to date—1924			2,084,974
Cumulative loading to date—1923			2,004,223



Articulated Trains and Self-Propelled Cars

A. E. R. A. Heavy Electric Traction Report Includes Study of Light Weight Equipment

THE COMMITTEE on Heavy Electric Traction of the American Electric Railway Association presented its report at the annual convention of that association at Atlantic City, N. J., on Monday, October 6.

The report includes a revision of the previously compiled bibliography of literature on the subject of heavy electric traction, a collection of information on branch line electrification and self-propelled cars, a study of train operation with particular reference to articulated trains, and a study of connections between cars used in train operation.

Bibliography

The actual compiling of the bibliography is being done by Prof. Warner of Yale University. The revised and up-to-date bibliography should be available in stencilled form early in 1925. It is the aim of the bibliography to contain all important articles on heavy electric traction published subsequent to the year 1904. The major part is to be restricted to publications, which have been selected as covering the widest field of this activity with a minimum amount of duplication. Arrangements have been made to include particularly good articles in other periodicals not included in the above list. Prior to 1904 the bibliography will be historical and will contain the most important articles dealing with this subject.

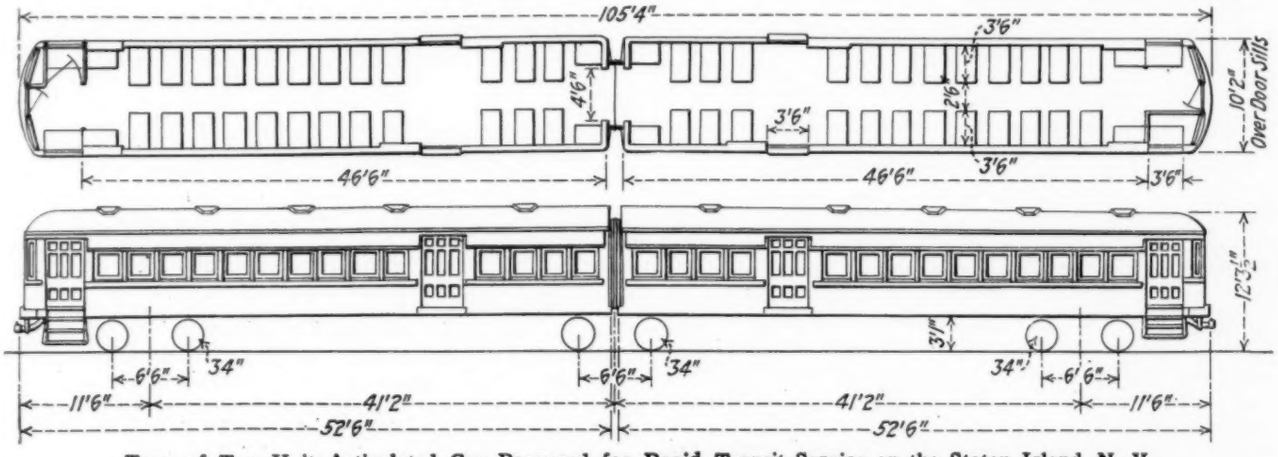
All articles published in a given year are indexed together. This will allow future additions to be made without changing electrotypes already made. Each publication is assigned a number. Each article referred to has a number chronologically consecutive for each publication for each year. Thus each reference has three numbers, e. g., 5-12-7, referring to *year, publication* and *article* respectively. The bibliography also gives the approximate number of words and states if article is illustrated. The committee recommended that this subject be reassigned to the ensuing committee to supervise and finally approve the bibliography before it is published.

Branch Line Electrification and Self-Propelled Cars

All of the information prepared by the committee on branch line electrification and self-propelled cars is included in the following:

"The operation of passenger service with steam locomotives and two or more trailing cars on branch lines generally shows a loss. The very infrequent service provided does not encourage passenger travel and is unsuited to meet competition of paralleling electric roads and motor buses on highways. It is therefore felt that relief from present conditions might be obtained by the installation of either electric or self-propelled cars and locomotives to take care of passenger service and possibly also freight traffic.

"Electrification under certain conditions may be justified and it will provide for excellent passenger service, either by single motor cars or multiple unit trains, as local conditions demand. Freight traffic may be taken care of with entire success by electric locomotives. Owing to the small passenger business and small freight tonnage usually handled on branch lines, electrification may introduce prohibitive capital charges which will offset its advantages. This condition may be modified in favored localities by the purchase of electric power from public utility companies, thus making it unnecessary for the railroad to bear the first cost of a power house or possibly sub-stations.



Type of Two-Unit Articulated Car Proposed for Rapid Transit Service on the Staten Island, N. Y., Lines of the B. & O.

"Self-propelled gas engine cars have been successful in meeting branch line passenger service requirements with small light weight cars. There is a demand, however, for heavier cars and for locomotives, and to meet these conditions experiments are now being made with electric multiple-unit control of gas engine driven trucks placed under one or more cars. This provides for driving all four axles of a single car and for the control of this car from either end, and also greatly widens the field of application of gas drive to include multiple-unit trains and small locomotives.

"A double-end unit car using a gasoline engine and hydraulic transmission with a capacity to seat sixty passengers has been in operation on the New York, New Haven & Hartford since the fall of 1923. This form of drive is a promising development and if proved successful will broaden the field of application of the gasoline engine in the traction field. Gas electric drive of motor cars and locomotives is entirely successful and applicable to branch line service. Electric cars can be operated, double-ended, singly or in multiple-unit trains. Two motors are usually placed upon one truck, but equipment can comprise four motors if service de-

mands the operation of a heavier car for hauling one or more trailers. Gas electric locomotives of 40 tons are in operation with one gas engine generator set and four motors on the axles. Larger locomotives may be equipped with two of these sets as it is entirely practicable to operate two gas engine generator sets in multiple.

"It would appear that gas engine drive with mechanical clutch is more suitable for small cars and that gas electric drive constitutes a better equipment for heavier cars, multiple-unit trains or locomotives, as the electric drive is free from troubles that apparently are inherent to the mechanical clutch. The gas electric drive has interesting possibilities but its economic value in branch line service is not as yet thoroughly determined.

"Oil electric drive, using a semi-Diesel engine operating at 600 rev. when delivering 300 hp., has been demonstrated to be practicable in a locomotive recently tested at the Ingersoll-Rand factory at Phillipsburg, New Jersey. This locomotive weighing 60 tons has been placed in regular operation in the west side switching yards of the New York Central in New York City. This short trial has been very successful and this type of locomotive offers the advantage of utilizing a low grade of oil. The oil electric drive appears to be a promising development for locomotives assigned to switching service and branch lines, but no small equipment of this kind has yet been built for motor car operation.

Conclusion

"The electrification of branch lines is entirely practicable from an engineering standpoint, but in many cases the first cost may be so high as to introduce prohibitive fixed charges out of proportion to the receipts from a small passenger and freight traffic. Gas engine drive is being tried out rather extensively with small cars, and to meet the demand for larger cars and locomotives, experimental equipment is being developed with multiple unit control of two or more gas engine driven trucks. Gas electric equipment is available for self-propelled cars and locomotives and apparently offers operating and economic advantages justfying its initial expense under some conditions. Oil electric drive employing high speed semi-Diesel engines is being experimented with and apparently holds promise of ultimately providing a self-propelled car and locomotive adapted to use low grade oil, thus broadening the economic application of self-propelled equipment."

Articulated Trains

The results of the study made by the committee on the subject of articulated trains was accompanied by a number of illustrations showing side elevations and floor plans of various types of articulated trains now in service, under construction or proposed for service. One of the illustrations is shown.

The other illustrations include the articulated train used on the Great Northern in England, which was described in the January 7, 1922, issue of the *Railway Age*, page 52; the train used by the City of Detroit; one of the trains for the New York Rapid Transit Corporation mentioned in the September 13, 1924, issue of the *Railway Age*, page 476, and two 2-car units used by the Milwaukee Electric Railway & Light Company and the Brooklyn-Manhattan Transit Corporation, respectively. Other illustrations show types of connections used between cars.

The substance of the report is as follows:

"Articulated train design and operation in the United States is, at the present time, in a state of more or less experimentation. There are many features in the state of development, which will, no doubt, prove to considerable advantage in improvement towards safer and more comfortable transportation on both rapid transit high speed service and the slower city surface cars.

"In England and on the continent, articulated steam trains have been operated for some time and it is reported that the riding qualities of the cars are improved and that the strains on the trucks, bodies and rails are reduced. It is felt that the articulation tends to steady cars against what is commonly called "nosing" or the effect of poor and low rail joints which start a weaving action destructive to trucks, bodies, etc. The articulated connection tends to lessen this nosing action and it is stated that with the reduction of the overhang of bodies on the trucks, "whip lash" action is reduced on curves and cross-overs.

"In rapid transit service there is a tendency to reduce the number of men comprising the crew.

"Where cars have been operated with long overhangs on sharp curves it is impossible for passengers to pass freely from one car to another and this is therefore somewhat of an obstruction in the reduction of the number of train guards. With the articulated train the overhang is done away with and passengers may pass freely from one car to another safely on account of the lack of lateral movement between cars, passage being provided through a drum or diaphragm.

"To the patrons of railroad companies operating rapid transit equipment one of the most common criticisms is noise. In our subways today one plainly notes, of course, that this noise emanates largely from the trucks and brake rigging and is magnified by the general construction of the subway itself. To entirely eliminate such noise is impossible but it can be lessened greatly by the reduction of loose parts in the general car construction. To reduce the number of loose parts, with reasonable maintenance, the strains placed upon them must be reduced and thereby the vibration and wear. It is quite reasonable to assume that by operating trains in articulated units with the reduced number of trucks, brake rigging and movable parts and side thrust, considerably less wear will be noted and marked reduction in noise be found.

"Another cause for complaint is brought about by uneven acceleration and braking of trains. With trains of articulated units the tight lock couplings, reduction of the number of control units and braking units permits of closer adjustment of regulating parts and smoother operation is to be expected. Again, based on these assumptions, strains in car body and truck parts are reduced and consequent maintenance. As a third item to the credit of articulated train operation where the crew is reduced, it is necessary to control the auxiliary circuits from fewer points depending on the train combination, and such reduction of course reduces the number of auxiliary devices such as lighting, switches, fuses, relays and supplies, the wiring all tending towards reduction of failures in service.

Connections Between Cars

In order to secure representative opinions concerning connections between cars including electrical, mechanical and air couplers, questionnaires were sent out by the committee to a selected group of railroads. Due weight was given to the various answers received according to the number of couplers operated and to the size of the road. An abstract of the answers received follows:

Mechanical Car Couplers

Of 14 replies to a question on car couplers, the consensus of opinion was that MCB couplers should be used only when cars from foreign roads or standard freight cars were to be handled. Three of the 14 felt that this coupler should be used on all cars, and there was an expression of opinion that the MCB coupler should be used for all heavy duty where short curves are not encountered.

Eleven roads offered suggestions for improving car coupler designs. Chief among these was the provision of a heavier anchorage; two suggested improvement in the uncoupling devices; and other suggestions were to harden the wearing parts and make them removable, provide means to prevent

kicking out of line in coupling, and lubrication of the main draft swivel casting.

Control Couplers

Of 17 answers, 11 said that draw-bar mounting of control couplers is desirable, while five consider it to be undesirable, apparently on account of higher maintenance costs.

Out of 10 replies to a question on the desirability of single head jumpers, nine felt that a jumper having one end permanently fastened to the car with a single head supported in a dummy receptacle when not in use, was undesirable. This is apparently due to the fact that in case of jumper trouble it is difficult to change the jumper.

Of 13 replies, nine felt that braid-covered cable for jumpers was satisfactory, although two roads enclose the cable in a hose, while one road was especially strong in its statement that cable covered with high-grade rubber covered without braid, was the most satisfactory.

Seventeen roads expressed opinions on control coupler locking devices 10 of which indicated that the present devices are satisfactory, while six stated that they are unsatisfactory.

Bus Couplers

Of 11 roads expressing opinions on draw-bar mounting of bus couplers, nine state that draw-bar mounting is desirable, while two state emphatically that it is undesirable.

Expressions of opinion concerning single head jumpers were obtained from 14 roads, 12 of which were to the effect that a single head jumper with one end permanently fastened to the car, is undesirable. This is apparently due to the difficulty in replacement and to the dangers of this form of coupling.

Braid covered cable for jumpers appears to be the most suitable, although one road claims that the highest grade of rubber is none too good.

Of 16 roads replying, 15 state most emphatically that it is desirable to disconnect the bus circuit from the power circuits before uncoupling bus circuits.

Automatic Couplers

The maximum number of control and bus circuits as given by seven roads varied from three circuits to fifteen control circuits and one bus circuit.

Of six companies replying, the majority stated that bus-connections are successfully carried in automatic couplers, the maximum capacities varying from 200 to 500 amperes.

Expressions as to improvements were confined to means for improving the air connections to prevent air leakage.

Practically all roads using automatic couplers feel that they are very successful.

Practically no data was secured on cost of maintenance of the various types of couplers, and such data as was collected varied so much that no definite conclusions may be drawn. However, it appears that the maintenance of automatic couplers is invariably lower than the maintenance of other types of control of bus-line couplers.

The report is signed by John C. Davidson, chairman, J. J. Sinclair, vice-chairman, C. R. Harte, sponsor, A. H. Armstrong, J. M. Rosenbury, Morris Buck, H. W. Cope, J. H. Davis, J. V. B. Duer, E. C. Johnson, Norman Litchfield, J. O. Madison, L. S. Wells, H. F. Brown, A. H. Daus.

The committee recommended that the subject of Self-Propelled Cars be assigned to the new committee for further study, that the subject of Articulated Trains be discontinued until actual operating data from existing experiments is available for study and analysis, and that the subject of Connections Between Trains be discontinued at least for one year. After the report was presented, the Association voted to accept the first recommendation and voted to continue study of the second and third subjects in view of their rapidly increasing importance.

Effect of Automobile Travel*

By C. M. Burt

Chairman, Passenger Department, Trunk Line Association

With the improvement in highways during the past few years the automobile has become an important factor in both local and long haul passenger transportation.

At first its principal effect was felt in local travel. Bus lines were established between local points where the volume of travel seemed to warrant, and the number in operation has increased materially from year to year. They operate with frequent service along the business and residential streets of the communities served, performing a pick-up and delivery service. Their fares are in some cases lower and in other cases they are the same or higher than the rail fares, but regardless thereof they control an important and large volume of local traffic on account of their convenience and frequency of service. Recently de-luxe touring busses have made their appearance and are successfully operated on the "all-expense" plan between the more important commercial centers in the East and various tourist resorts; their fares include not only the bus charges, but hotel bills, meals en route, etc. They are doing a successful business in a majority of sections where operated, and their number and the scope of their tours is fast increasing. We are reliably informed that since January 1, 1924, upwards of 1,500 new bus lines have started operation throughout the country, and that during the same period 5,400 busses have been purchased at a cost of approximately $30,000,000.

The privately-owned automobile, while at first employed by its owner for social or other use locally, is now used largely in daily travel between the owner's home and place of business, thus materially affecting patronage on suburban trains of the carriers. It is also used to a very large extent by the commercial man in his business travel, for the reason that more patrons in a given town may be visited, delays incident to train schedules avoided, and more towns covered in a day than is possible by use of train service.

The general use of the privately-owned automobile for long distance travel, visiting, sight-seeing and vacational trips, is fast increasing, as every observing person knows, and during a visit to Maine last month I was personally impressed by the number of foreign state licensed cars traversing the principal arteries of travel. During a temporary stop on the state road between Portland and Brunswick, out of 15 cars passing successively, I observed that 12 bore foreign state licenses covering the states of Massachusetts, Connecticut, New Hampshire, New York, Florida, Oklahoma and California.

An earnest effort has been made to obtain tangible and positive information covering the relative effect of automobiles upon day-coach and Pullman travel, but I regret that replies to inquiries indicate that no figures are available that will serve the purpose desired.

Illustrative of the effect of bus and automobile competition upon local travel, the Norfolk & Western advise that in 1916 they sold between Norfolk and Suffolk, Va., a distance of 23 miles, 110,194 local tickets; in 1923 they sold between the same points 29,168 tickets, a decrease of 73.51 per cent. Passenger carrying bus service was inaugurated between the two points during the interim, and it is claimed the decrease is due largely, if not wholly, thereto.

The Baltimore & Ohio advise that on their Hillsboro Branch operating between Blanchester and Hillsboro, Ohio (22 miles), 5,912 passengers were carried during month of June, 1916, but for the same month in 1924 only 1,970 passengers were carried, and that as a result of the decrease in

*Statement before the Interstate Commerce Commision at the Mileage Book Hearing at Washington, D. C., on September 27, 1924.

patronage, train mileage was reduced from 3,456 miles to 2,376 miles. On their Berkeley Springs Branch between Hancock and Berkeley Springs, Md. (6 miles), 4,253 passengers were carried during month of June, 1916, while for same month 1924 but 875 passengers were carried.

The Delaware & Hudson advise that between Albany and Altamount and intermediate stations (17 miles) for year 1915 they carried 253,394 passengers and that for year 1923 they carried 179,331 passengers. Due to this condition train service has been reduced with the consent of the public service commission. They further advise that in 1915 they handled in the aggregate 6,943,618 passengers; in 1923 they handled 4,267,746 passengers, a decrease of over two and a half million passengers or 38 per cent, and that their passenger miles for 1923 as compared with 1915 shows a decrease of 15 per cent.

All of these decreases are attributed to bus and automobile competition, and principally to the privately-owned car—and similar conditions apply on other carriers in Eastern territory.

The police department at Atlantic City on Saturday, August 23, undertook a check of automobiles entering Atlantic City over the bridge that serves as an entrance to the city from the north and west, and between the hours of 8:00 a.m. and 4:00 p.m., the registry indicated the passing of 13,900 cars.

The New Jersey state police made a similar check on the White Horse Pike, which is the main boulevard between Philadelphia and Atlantic City, on Sunday, August 10, their record showing 22,787 cars passing a given point.

On the National Highway at Cumberland, Md., a check of passing automobiles was made on September 4 and between the hours of 7:00 a.m. and 6:00 p.m. 2,359 cars were recorded as passing a given point; the check indicating cars from 32 states, 1,153 bearing Maryland licenses, 491 Pennsylvania, 214 West Virginia, 31 Virginia, Ohio 193, Florida 5, Louisiana 2, Mississippi 2, New Jersey 24, New York 24, Missouri 9, Vermont 1, Delaware 7, Rhode Island 1, Connecticut 6, Michigan 18, Wisconsin 4, Illinois 27, Texas 2, Colorado 13, Nevada 1, Oregon 1, Washington 3, Massachusetts 1, Wyoming 5, Kansas 1, Iowa 4, South Dakota 4, Indiana 20, Tennessee 1, California 1, District of Columbia 82 and Kentucky 9.

There is no assurance the occupants of these cars would have availed of train service in the absence of automobile accommodations; but on the other hand it is reasonable to assume that a large proportion of this travel would have moved by train service, either availing of coach or Pullman car accommodations, although no one can tell how much or the proportion that would have availed of the different classes of accommodations.

In the absence of other means of ascertaining the positive effect of privately-owned automobile travel upon long distance tourist travel, we undertook to develop through the hotels at Poland Spring, Me., White Mountains, N. H., Adirondack Mountains, N. Y., Atlantic City and Asbury Park, N. J., and Niagara Falls, N. Y., the number of automobiles registered during the present summer season, the states from which they came according to their state license, and the number of guests in each, as compared with the number of guests reaching the same hotels by rail.

The proprietor of the Fabyan House, which is a prominent hotel in the White Mountains, reported that during the period between June 26 and August 31, inclusive, there were registered 1,800 guests, 908 of which arrived by train and 820 by automobile, their register of automobile patronage showing the following:

State	No.	State	No.
New Jersey	80	Maryland	30
New York	150	Michigan	10
Massachusetts	200	Illinois	10
Pennsylvania	90	Washington	15
Connecticut	40	Florida	10
Maine	15	Montreal	50
New Hampshire	20	Wisconsin	6
Quebec	14	Indiana	15
Rhode Island	15	Ohio	5
Missouri	4	Texas	10
Alabama	3	Toronto	10
Iowa	9	Virginia	5
Oklahoma	4		

The proprietor of the Crawford House, another prominent hotel in the White Mountains, advised that while unable to submit supporting figures he felt that a conservative estimate of the automobile patronage of his hotel during the present season as compared with patrons arriving by rail would be 85 per cent by automobile, 15 per cent by rail.

The Ricker Management at Poland Spring, Me., advises that between the opening of the Poland Spring House in June and September 8 this season 3,600 guests arrived by automobile as compared with 556 by rail, and that prior to September 8 the Mansion House has this season registered 2,029 guests arriving by automobile as compared with 728 by rail. They have further furnished a list of the automobiles registering at their garage during the season prior to September 1, 1924, and the states from which they came according to their state licenses as follows:

State	No.	State	No.
California	2	Nebraska	1
Colorado	7	New Hampshire	41
Connecticut	82	New Jersey	105
Delaware	2	New York	375
District of Columbia	15	North Carolina	1
Florida	8	Ohio	48
Georgia	3	Pennsylvania	116
Illinois	33	Rhode Island	73
Indiana	5	Tennessee	1
Iowa	1	Texas	9
Kentucky	3	Utah	2
Louisiana	4	Vermont	7
Maine	114	Virginia	3
Maryland	12	West Virginia	2
Massachusetts	697	Wisconsin	2
Michigan	10	New Brunswick	2
Minnesota	17	Ontario	3
Missouri	3	Quebec	11

Practically all of this resort traffic if moved by train would naturally have patronized Pullman service on account of the travel distance and character of the traffic involved. As the result of our interviews and correspondence we are satisfied that the above is fairly illustrative of their season's business.

For the purpose of demonstrating in concise form the growth of automobile usage we have undertaken to develop through the automobile license bureaus, public service commissions and other state departments, the number of passenger carrying automobiles in use throughout Trunk Line territory, and a statement is submitted showing:

1. The number of passenger carrying bus companies for which state licenses were issued Year 1923.
2. The number of privately-owned automobiles for which state licenses were issued for the Year 1915 as compared with the Year 1923.

In the states of New York, New Jersey, Pennsylvania, Delaware, Maryland, District of Columbia, Virginia and West Virginia.

State	Number of passenger carrying bus lines for which state licenses were issued 1923	Number of privately owned automobiles for which state licenses were issued 1915	1923
New York	243	207,637	964,492
New Jersey	340	(b) 78,232	326,760
Pennsylvania	600 (approximate)	152,365	899,696
Delaware	(c) No information	4,657	28,459
Maryland	250	(a) 67,652	188,793
Virginia	165	(b) 21,357	(f) 210,363
West Virginia	(d) 40	(b) 10,342	143,260
District of Columbia	14	(e)	100,015

(a)—Figures shown are for year 1918.
(b)—Includes all class of motor vehicles.
(c)—Service confined to Wilmington and New Castle.
(d)—Operating from July 27 to December 31, 1923.
(e)—Annual registration not required in 1915.
(f)—Figures shown are for the year 1924.

THE LEGACY left by the late Dr. P. H. Dudley to Yale University for the establishment of a professorship of railroad engineering amounts to $152,679, according to information filed in the Surrogate's Court, New York City.

Pennsylvania's Experience with Automatic Stops

Cab Signals Might Be Used Without Brake-Setting Feature —Comprehensive Declaration of Principles

THE PAPER by A. H. Rudd, signal engineer of the Pennsylvania Railroad, before the Swampscott meeting of the Signal Section of the American Railway Association, briefly reported in the *Railway Age* of September 27, page 548, was an unusually full and detailed discussion of the whole subject of automatic train control; and it is of interest, not only as a summary of facts connected with the most elaborate experiment yet made in that field, but also as an expression of opinion; and the opinions of Mr. Rudd may be accepted, no doubt, as those of the railroad company. The substance of the paper is here given, omitting descriptive details of apparatus.

In reviewing the history of the art, Mr. Rudd went back to 1880, giving Joseph Wood credit, as the co-inventor, with Vogt, for the glass-tube apparatus tried on the Pennsylvania. He does not mention the stops in the Interborough subways in New York. Finnigan's first experiment on the Pennsylvania was in 1914. In that same year the Pennsylvania planned to try Simmen's apparatus, but when this was sold to the General Railway Signal Company, for trial on the lines of the Brooklyn Rapid Transit Company, the project fell through.

The Pennsylvania acted with reasonable promptness after the Interstate Commerce Commission issued its first order, January 10, 1922; and the first circuit was energized on the Lewistown branch on June 22, 1922. The government inspected this apparatus on October 11, 1922, and the whole was put in service in May, 1923. The use of visual block signals and train orders was discontinued July 11, 1923. The commission at first refused to inspect the completed system; but finally began an inspection on September 16, 1924. Mr. Rudd then goes on to give the reasons for selecting the continuous speed-control system, and for operating without visual signals. The proposition to operate without visual signals was advanced by the operating vice-president (General Atterbury). The reasons for taking this course were embodied in the report of the Signal Section committee and were printed in the *Railway Age* of September 27, page 547. On half of the branch the spacing of trains is arranged under a modified A. P. B. system, while on the other (eastern) half the system is remote control by the train dispatcher. The trains of the branch run over the Williamsport division a few miles (double track) and here the automatic train control is superimposed on the alternating current automatic block signal system.

The three speeds, Slow, Restricted and Authorized mean (S) 15 miles an hour for all trains; (R) 30 for passenger and 20 for freight; (A) 60 for passenger and 40 for freight. Speed indicators were installed on locomotives but were afterwards taken out as unnecessary.

Continuing the speaker said:

Value of the Cab Signal

"The cab signals give good service and are as reliable as the wayside signals and it is my personal opinion that, if any additional safeguards are required or justified, in order to handle our traffic safely, expeditiously and economically, as required by law and desired by every one, the addition of these cab signals will, with the type and character of men who run our trains, provide as much protection as the complicated apparatus required for any system of [automatic] train control, and more protection than the straight stop with the permissive feature, excepting in the case of a train with an engineman gone suddenly crazy and the fireman not knowing it; and, in the case of either [automatic] control or stop, an engineman and fireman both absolutely incapacitated, a contingency less likely to occur than a failure of the apparatus to apply the brakes.

"The engine signal apparatus is the culmination of 50 years of signal development. The pneumatic apparatus for actuating the brake apparatus is comparatively new and it is here to a large extent that future development must be made. It should, therefore, seem the logical and sensible course, if, as stated, any safeguards, in addition to our modern automatic signals and interlockings are justified by the facts, to first extend and modernize our automatic block signal systems, then install the continuous controlled cab signals, meanwhile developing the brake application by simplifying it if possible and then, if the proportion of accidents which these devices actually would prevent is large enough to warrant further additions, proceed to 'paint the lily and gild the refined gold.'

"As for the pneumatic equipment: 12 locomotives were originally equipped with the centrifuge under the boiler; the 13th has since been equipped with end-of-axle drive, mounted on the front right end, and two or three are being equipped with center-of-axle drive mounted at the middle of the pilot.

"*Failures.* We have had a good many days and some weeks with no failures. We have had very few failures to apply the brakes. We have had a good many brake applications where none was desired. We have made a number of minor changes since the first apparatus was placed on the first locomotive just about two years ago, but more than half the locomotives are operating in service with practically all of the original design of equipment. We have made many improvements. We are still making them. We expect to make more. * * *

Effect on Track Capacity

"The Interstate Commerce Commission requires that the stop device shall be operative at braking distance from the stop location * * * . We have as yet had no ruling establishing a basis for this distance. We know that the straight stop without release, requiring each train approaching a home signal at stop to receive an application at the distant signal, restricts traffic, and that if the permissive feature is applied it probably will not. We know that our installation will not impede traffic and we know it is safer than the permissive feature, but we do not know what braking distance is, and would like to find out.

"Our track sections are laid out for braking distance with closed throttle for passenger trains at 60 miles an hour plus 20 seconds. Our engine arrangement provides for five seconds for engineman to acknowledge change in signal. The apparatus does not close the throttle when brakes are applied. Unless some more devices are added to accomplish this, it is self-evident that, as the device is to function when the engineman does not, the blocks must be increased in length and, therefore, fewer trains can be run unless we can proceed on the assumption that a disabled engineman will always close his throttle before becoming disabled. * * *

"The straight stop will interfere with the freedom of train movement. With the permissive feature a smart engineman may absolutely annul its effect even if he misreads his signal, and may do so in every possible case except only where he misses a signal location entirely. It costs more money than the straight stop. Granted, however, that either is reasonably cheap and will get by the commission, where is it to be located? Braking distance away from the danger

point with an open throttle? Perhaps, yes; but for what speed? That is the crucial point. With an engineman disabled, running on a slight down grade or even level track with throttle open, constantly accelerating for six, eight or ten clear blocks, what is safe braking distance with a service application?

"Stops, as we see it, must be located maximum safe braking distance for maximum authorized speeds, and maximum speed governors must be placed on the locomotives to prevent their exceeding the speed for which the stops are located. The cheap device, in order to meet the one remote contingency for which it is designed, becomes expensive in that it gives less protection for the money involved than speed control does for what it costs with all that it gives.

"When continuous speed control functions properly, it restricts traffic less than any other system now on the market and under certain conditions may facilitate it. For instance, if installed on a line where passenger trains are run under absolute block signals ten miles apart, it will enable more to be run; but, if we can railroad with such trains ten miles apart, is it needed for this purpose? Especially where automatic signals may do the same thing.

"Cost of Operation and Maintenance.—This is still problematical. Our opinion is it costs a whole lot more than it is worth under present conditions, when our funds could be spent to far greater advantage for safety devices which are more urgently required. * * * "

Conclusions

Mr. Rudd's summing-up, slightly abridged, is as follows:

1.—For thin lines of light traffic, manual block is sufficient protection.

2.—On busy lines, straight stop will limit capacity.

3.—Stop with permissive feature permits engineman, if alert enough to push a button, to do anything he pleases except where he cannot see a signal or guess its location.

4.—Speed control is, therefore, better protection.

5.—Any system of speed control requires complicated apparatus on the engine whether of the inch-worm measuring variety or in the shape of a centrifuge or governor.

6.—Even the straight stop requires a maximum speed governor to make it effective.

7.—Throttle should be closed when brake is applied to prevent decreased capacity. Closing the throttle has its disadvantages, especially on speed-limit curves where it is left open to steady the train.

8.—The continuously controlled cab signal is reliable, and another year or so will iron out the few remaining kinks.

9.—If the analysis of Committee X, in its report, is correct, such a signal superimposed upon existing automatic systems, until such time as all locomotives are equipped with it, will for all practical purposes provide as much protection as the train control, thereby eliminating the installation and maintenance of a lot of complicated apparatus and, while giving continuous and reliable information of conditions ahead (instead of at certain fixed points) allow the engineman (and in case of his disability, the fireman) to properly control his train, as far as the braking apparatus will let him do so, without interference and as he properly should do.

10.—For years the Interstate Commerce Commission urged the adoption of the manual block system and rightly so. Then it grew to appreciate the fact that the automatic system provided as much safety and greater flexibility, and under these block systems collisions have steadily decreased. But a change came over the spirit of its dreams and for some time the automatic stop was the panacea for all evils, and now it or train control is for the time being an absolute requisite for safe operation on some busy lines and on some which will not be so busy after it is installed. The latest development is the interpretation of Section 2(b) under Functions, in Order 13413, Commissioners Esch and McChord being the interpreters, Commissioner McManamy dissenting. * * * Under this interpretation the following interesting situation exists: 1. Straight Stop. No acknowledgment. Train may then run at any speed possible until again stopped. 2. Straight Stop; Permissive Feature. "Enginemen may if alert forestall the application of the brakes by the automatic train stop device and control his train in the usual manner in accordance with hand signals or under limits fixed by train order or prescribed by the operating rules of the company"—or anyway he pleases. It will be noted that this does not prescribe any fixed point at which he may forestall or any limits through which he may so run, although it is presumed that he must again forestall somewhere. 3. Speed Control. Stop; "after which train may proceed under low speed restriction until the apparatus is automatically restored to normal or clear condition by reason of the removal of the condition which caused the stop operation." It will be noted that in this case the train may proceed under low speed restriction indefinitely without recurrent acknowledgment. See Functions 2(a) Order 13413. 4. And yet a system requiring an acknowledgment of every change to a less favorable condition with maximum, restricted and slow speed limitations, is penalized by requiring an additional acknowledgment when a train restricted to low speed passes a stop signal.

Mr. Regan has recently shown what tremendous savings may be effected by the elimination of this stop. With three-speed or two-speed continuous control, designed to effect this saving, a train running at slow speed must acknowledge every stop signal. With others not so designed, trains running at the same speed need not acknowledge, and, with other devices, the train may run without stopping and at unlimited speed by simply forestalling; and all will meet the requirements as laid down by the commission and Division No. 1 unless some different ruling has been made within the last few days. The system we have in service does not provide for this recurrent acknowledgment, neither is it "Endowed with a discretionary mentality." However, that may be required later.

11.—It is about time we stopped straining at gnats and swallowing camels; that we ceased making mountains out of mole hills * * * .—12.—* * * On our lines automobiles are a greater menace than trains ahead. To make safe the pathway for trains no new grade crossings should be permitted and some should be abolished each year; a far greater number should be protected. The money otherwise available should be used: 1st—To install manual block, where passenger trains run. 2nd—To modernize present automatic signals to the highest efficiency. 3rd—To extend automatic block systems with the necessary interlockings, using signals without moving parts spaced for future installation of continuously controlled cab signals and for trains running with closed throttle at maximum authorized speed, preferably controlled by alternating current track circuits to reduce foreign current interference to a minimum, and including in the installation flashing lights (wig-wags) indicating (to highway travelers) the approach of trains at all important grade crossings where the nature of traffic, sidings, etc., will not make their indications misleading. 4th—To superimpose cab signals on or substitute them for the automatic (visual) signals, meanwhile developing train control along lines of simplicity. 5th, and finally, when the *principal* causes of fatalities and injuries have been eliminated * * * to install the then fully developed, adequate and efficient train control.

As I stated a few months ago, "train control is an iridescent dream. Highway grade crossing accidents are a nightmare." Let us eliminate the nightmares and then we can "go, not as a quarry slave at night scourged to his dungeon," but "sustained and soothed by an unfaltering trust," we can wrap the draperies of our couch about us, and lie down to *pleasant* dreams.

Railroads Participate in Safety Congress

Talks from "Cab and Caboose" Men Figure Prominently in National Meeting at Louisville

THE NATIONAL SAFETY COUNCIL held its thirteenth annual congress at Louisville, Ky., on September 29 and October 1, 2 and 3, with approximately 2,000 safety workers and visitors present. Both general and sectional sessions were held. These were addressed by numerous men of prominence in safety investigational or promotional work and were supplemented with an extensive exhibit of safety appliances and methods, and by a safety parade; the latter being held under the auspices of the city and including floats provided by the safety congress and by local railroads.

The sessions of the steam railroad section, which had a registration of 124 safety officers and visitors, representing

One of the Railroad Floats in the Safety Parade

57 railroads, were held throughout the mornings of Tuesday, Wednesday and Thursday in the Seelbach Hotel. Henry Bruère, a director of the Chicago, Rock Island & Pacific and the winner of the recent *Railway Age* contest for the best paper on co-operation between railways and their employees, and Charles Frederick Carter, author of historical works on railroads, both delivered addresses before this section. The officers of the Steam Railroad Section were: Chairman, F. M. Metcalfe, Northern Pacific, St. Paul, Minn.; vice-chairman, Charles E. Hill, New York Central, New York, and, secretary, E. R. Cott, Hocking Valley, Columbus, Ohio. As a result of the election the following officers were chosen for the ensuing year: Chairman, Charles E. Hill; vice-chairman, A. C. Rhoweder, Duluth, Missabe & Northern, Duluth, Minn; secretary, E. G. Newman, Union Pacific, Denver, Colo.

Safety Work As Key to Better Co-operation

Mr. Bruère discussed the relationship between safety work and the attainment of better management through co-operation, in connection with which he expressed the belief that the effect of safety work on railroads is not confined alone to preventing accidents but is of value in other respects; no influence in American industry has so emphasized the importance of co-operation between employers and employees as the safety movement. He spoke in part as follows:

"I don't suppose that there is in the whole field of industrial relations a more pressing question from the standpoint of the public than that of the relation between the railroad companies as employers, railroad managers as representatives of employing railroad companies, and railroad labor. In the railroads there should be the heartiest kind of co-operation between the rank and file and managers and those whom the managers represent, namely, the employing companies.

"But it is an outstanding fact that the great body of railroad employees are, on most questions of public importance, arrayed on the opposite side of the fence from those who are responsible for the ultimate success of the operation of the roads as private enterprises.

"As I look about for a solution of the riddle, it seems to me that in this safety movement there is a suggestion. The safety movement is a recognition that not only are you engaged in a humanitarian work, but that you are engaged in matching up in a frank and candid way the self-interest of both parties involved in the enterprise.

It was formerly regarded as almost an inseparable part of railroad employment that men should be exposed to hazard and injury. If a man was on the railroad he was likely to have his leg or his arm cut off. Today that seems thick-skinned and wholly out of keeping with the proper point of view. The idea now is that railroad work should be safe work.

So you can have the conception developed among executives, among owners, among the public generally, in the press and among the rank and file of railroad workers, that a railroad is a public service enterprise, operated as a business under all the tests of good business management, with the necessity for proving its balance sheet, and also a concern responsible for the welfare of two million men whose services contribute to the upbuilding and progress of the United States in a way which is hardly comparable with the contribution of any other industries. If they will simply realize that, you can, by inviting groups of working men the same way that you do in your safety activities, counsel with them as to how they can do the work better, tell them when they have done it better. Then you will get the same spirit, I believe, that you have in safety work."

Carter Eulogizes Coffin's Work

Charles Frederick Carter deplored the indisposition to carefulness that has increased crossing casualties 203 per cent in 12 years. He brought out that the New York Central is spending more than $1,000,000 a year for protection and has spent nearly $15,000,000 in the last 25 years in New York state alone for grade crossing elimination work. Mr. Carter devoted his talk especially, however, to a eulogy of the late Lorenzo A. Coffin, of Iowa; preacher, railroad commissioner, and drafter and champion of the first safety appliance act, thirty or more years ago. Coffin was declared to be "the man who took the first great constructive step in promoting safety on the railroads." The result of Mr. Carter's address was the adoption of a resolution whereby the steam railroad section recorded its gratitude and appreciation for Mr. Coffin's life and railway safety work and recommended that steps be taken to establish "some permanent mark" to his memory.

Men From Cab and Caboose Talk

A unique feature of the meeting was the assigning of an entire session to the presentation and discussion of papers

by men regularly engaged in running trains and locomotives or occupying supervisory positions in other departments.

The trainman was represented by F. G. Kileen, general chairman of the Brotherhood of Railway Trainmen, of the Wabash, who strongly endorsed the everlasting preaching of safety as the best way to get results. Mr. Kileen denounced in the excuse often heard from trainmen for their indifference towards safety work that the railway managements are interested in safety only for the money they can save by the prevention of accidents. The managements have a human interest in accident prevention work.

The "man in the cab" was represented by Daniel J. Buckley, for 35 years a locomotive engineer on the Baltimore & Ohio. He voiced an impassioned endorsement of organized safety, he, himself, having been orphaned as a boy by a railroad accident. He dwelt upon the great advance which has been made in relieving the enginemen from the anxiety and danger of earlier years through the development of safety appliances, signals, etc., and ridiculed the talk of "the good old days." He emphasized the importance of genuine safety spirit, actuated by unselfish motives. He cited a division of the Baltimore & Ohio where no passenger has been killed in a train accident in 33 years, notwithstanding that the number of passengers carried is approximately 14,000,000 a year.

In discussing safety from the viewpoint of the transportation department, A. T. Newman, assistant trainmaster, Union Pacific, prescribed as an essential to effective safety work the avoidance of too much preaching and the doing of more teaching. Safety work, to be effective, must be built up among the men even as certain habits must necessarily be cultivated in a child. The safety example is more effective than precept. The speaker insisted that, with all their zeal and effort the work of a few safety workers is futile without backing and support from departmental officers.

W. G. Ashworth, roadmaster, Northern Pacific, dwelt on the track situation, adhering closely to the practical phases of the subject. Mr. Ashworth laid emphasis on the loss of man power that results from injuries among track forces and cited lack of discipline, laziness and the absence of that close contact with the safety workers which prevails in the shops, as responsible for the large number of injuries still occurring among track forces. In the furtherance of safety work he favored the scrutinizing of men for physical infirmities when employing them. He would pair off an experienced man with an inexperienced one. He stressed the importance of matching men closely when team work is required, as in handling rail. However, accident prevention will continue to be a real problem among track forces as long as the foremen must be continually laying off seasoned men and hiring inexperienced men because of lack of uniformity in the size of gangs.

D. M. & N. Safety Record

Safety from the viewpoint of the car department was discussed by W. A. Clark, general foreman of the Duluth, Missabe & Northern's car department, which was reported to have had but one minor accident for the last 34 months, during which 2,412,000 man hours of car repair work was carried on. Mr. Clark presented a detailed report of the policies and practices in vogue which are credited with this record of accident prevention. Selected portions of this report are reproduced as follows:

The supervisors in charge of new work or the rebuilding of cars must be ever alert to see that the maximum admissable floor space is kept free from stumbling, falling, and tripping hazards; that material is safely piled, and that proper and necessary scaffolding is provided; that goggles are furnished and worn when drilling, reaming, chipping and riveting is being done; that riveters and helpers have a tight band or handkerchief around their necks to protect their backs and guantlets or tight sleeves be used to prevent hot rivets from going up their sleeves.

In handling structural steel and plates with cranes, safety hooks should be used. One man only should give signals to the crane operator, and when cars are moved to new positions by cables or cranes, operators should be instructed not to take signals to start or move the crane or the cars along the tracks until some competent person is stationed at the end of the car in the direction it is to be moved, to make sure that no one is in the way, and that no men are underneath or between, or in the hopper openings. While handling material with cranes and carrying it from place to place in

The Union Pacific Delegation

shops, a man should walk ahead of the load and clear the floor or warn those underneath to move from under until the load has passed. Cranes should also be equipped with gongs or klaxons to operate automatically while traveling or moving.

Absolute confidence should not be placed in the reliability of jacks. Horses should be used as an auxiliary in all cases where men have to go under car bodies. Also an absolute rule should be made that no man be allowed to expose his body or limbs between the trucks and frame of a car until proper blocking is placed between the truck bolster and the car, or under side bearings.

In a shop where cranes are used no one should be allowed to go under a car while it is being held by crane or cables until proper horses and blocks have been placed. To prevent men from putting their hands on the inside of crane hooks or taking hold of cables while lifting cars, a handle should be put on the hook on the opposite side from the point, and all concerned properly instructed in the safe method to handle hooks or cables.

No tools, car parts, knuckles or knuckle pins should be left on the platform ends, or the tops of cars while cars are being repaired. An inflexible rule should prohibit the practice of men putting their hands on center pins to guide them in place while lowering car bodies on trucks. Also blocks should be used under all conditions of service that require men to expose their bodies or limbs under any part of car that may be raised or jacked up, or held up with a bar.

Car men should not be allowed to raise steel doors, bolsters or other parts with bars, and other men expose their hands or fingers until the part raised has been made safe by blocking securely.

Air hose and fittings should be inspected weekly for loose clamps and soft inside linings. The use of oil should be prohibited in mounting and repairing air hose fittings. Acetylene and oxygen gas lines and fittings should be in-

spected and back pressure valves filled daily if necessary.

Instruct men not to use common colored waste to wipe their hands or face. Wire, pins and other rough particles may break the skin and cause blood poisoning.

A first aid kit with iodine swabs should be available in all shops and whenever a workman's skin becomes broken or abraded it should be treated with iodine to prevent infection.

An electrician should be called to attend to all electrical repair work.

Wheel borers, axle turners, bolt cutters, punch and shear operators must wear goggles while working on machines. Punch and shear machines, wrenches, hammers or any object falling from the throat or head of machine and striking the tripping lever may result in a serious injury, therefore this particular lever should be covered or protected in a manner to make machines operative only when lever is pressed by foot of operator.

While cleaning brake cylinders use a safe clamp around piston sleeve with a ½-in. bolt. This will prevent spring in brake cylinder driving the non-pressure head and pinching workman's fingers or the piston from striking him while cleaning it. Placing a nail in the sleeve in place of a clamp is not a sure method of preventing injuries. When testing brakes see that the cut-out cock is closed, and pressure allowed to escape from reservoir before making adjustments. This will prevent workman from being struck by levers. Also use a key bar in the key bolt hole to put it in line, instead of attempting to do this with the fingers. Air hose used for testing cars, or trains, should have a drain cock in the hose head to reduce pressure before uncoupling and to prevent particles of dirt being blown into the workman's eyes.

The head of the department should write a letter of encouragement or suggestions on the first of each month to each foreman and safety committee member commending them, advising or suggesting what should be done to promote safety work.

Inspectors' Session Informative

The Louisville program was notable for giving an entire session to consideration of the subordinate safety officer's viewpoint on safety programs and the problems confronting them. In opening the session J. A. McNally, safety inspector on the Wabash, again referred to the necessity for support from officers and managements in safety work, making it plain that lack of assistance from this quarter is demoralizing. He declared the reluctance of shop men to wear goggles to be a principal difficulty met in safety work among the men and emphasized the importance of holding foremen responsible for the results, as illustrating the marked improvement that is possible with adequate support from the department heads, he cited the Wabash shop record where injuries had been reduced in one year from over 80 a month to 12 a month. It was Mr. McNally's claim that "the day is coming when a foreman's chance for promotion will depend on his safety record."

The discussion brought out that on the Atlantic Coast Line the goggle problem is being met effectively by requiring all foremen and visitors in shops as well as workmen, to wear goggles. After a locomotive engineer protested against the practice of applying the blue-flag rule by setting a flag on the pilot beam of an engine, often out of immediate sight of the engineer, it was brought out that on the Union Pacific the blue-flag is placed instead in a bracket under the window of the cab, where it is proving entirely satisfactory, while the Frisco's method is that of providing an extension socket on the pilot to bring the flag within unobstructed view of the engineer at all times.

The discussion following the presentation of a paper during the session by H. S. Corbin, Atlantic Coast Line, on organizing and maintaining interest among safety committee men, resulted in a controversy over the proper mode of the committeeman's selection and his period of service on the local committee. It developed that some roads, like the Atlantic Coast Line, leave the selection of the committeemen to the officer-members of the local committees, a stand which the Atlantic Coast Line defends with the argument that it places direct responsibility on the officers for safety results; while other roads, including the Baltimore & Ohio and the Wabash, leave the selection of the committeemen preferably to the retiring representative. Again, where it is the practice on the Wabash for committeemen to serve a year, they are rotated once a month on the Baltimore & Ohio and every four months on other roads, including the Union Pacific, the later practice being advocated on the grounds that this arrangement is rapidly converting employees into zealous safety workers through the educational value of the committee meetings of the boards on which they have served.

The worst evils in local committee work were represented as being the prolonged sessions that are held on some roads, the practice of discussing other business at these meetings to the neglect of safety matters and a prevalent practice of department heads, including the division superintendent, to send substitutes to represent them at the safety meetings. J. A. Clancey, New York, New Haven & Hartford, also condemned the practice of holding meetings at which nothing is done, such meetings, in his opinion, usually indicating that the committeemen had neglected to report findings until considerable time had elapsed or hesitated to express themselves because of the attitude assumed by the chairman of the meeting.

Discussion by D. E. Satterfield

In a discussion on enlisting the co-operation of local safety officers and others, D. E. Satterfield (B. & O.), charged the labor organizations with responsibility for the all too frequent absence of the proper spirit that should be taken in connection with safety promotion work. He indicated that too many of the representatives of the labor organization, of which incidentally he is a member, conduct themselves as though they were afraid they might be guilty of helping the management if they should enter enthusiastically into safety work, forgetting that in promoting safety they are helping just that much more to serve the very men whom they have pledged themselves to serve. He reminded the audience that the keynote of co-operation is mutual regard and contended that if safety workers do not have this regard for their associates they had better leave the safety work alone. A number of roads, including the Union Pacific, reported harmonious relations with the employees' organizations, the latter road reporting that the five brotherhoods participated actively in all local affairs and have permanent representation on the central safety committee.

Are Safety Officers Men of Experience?

During the sessions an announcement was made of an analysis of the occupations of safety officers prior to their engaging in this work, for the purpose of providing facts on which to answer questions regarding the "practicability" of these men. The analysis disclosed that 63 representative safety officers represented 249 railway occupations, ranging all the way from water boy to general superintendent.

Of the special delegations in attendance at this congress the largest, consisting of 27 members, was from the Pennsylvania, while 16 delegates were in attendance from the Union Pacific, the latter comprising in addition to the assistant to the general manager in charge of safety, an assistant trainmaster, a chief clerk, a general roadmaster, a section foreman, a locomotive engineer, a conductor, a brakeman, a switchman, a cabinet maker, a machinist, a boilermaker and a blacksmith.

Argument on Missouri Pacific Acquisition of Gulf Coast Lines

WASHINGTON, D. C.

ORAL ARGUMENTS on the application of the Missouri Pacific for authority to acquire control of the Gulf Coast Lines by purchase of the capital stock of the New Orleans, Texas & Mexico at 120 were heard by the Interstate Commerce Commission on October 3, the only opposition being expressed by Nelson Phillips, representing the city of Palestine, Tex., who argued that the acquisition of control of the International-Great Northern, which would go with control of the N. O. T. & M., would be in violation of the constitution and laws of Texas and who asked that if the commission should grant the application it do so only on condition that the International-Great Northern maintain its shops and offices at Palestine.

Carl A. de Gersdorff, who presented the principal argument in support of the application, said that the "representations" made by the Texas railroad commission that the control sought would be in violation of Texas law have no place in this case because control of the Texas corporations involved is now in a Louisiana corporation, the New Orleans Texas & Mexico, and that the acquisition of the latter by the Missouri Pacific would not change the situation in that respect. He said that the stock of the N. O. T. & M., which the Missouri Pacific proposes to pay 120 for, has a book value of 151 and that while it is now paying 7 per cent the indications are that it will earn 20 per cent in 1924. In reply to a commissioner he said that the control of the company is so closely held that it could not have been acquired in the market.

When he referred to its present prosperity after the reorganizers of the Frisco system had decided to let it go some years ago Commissioner Esch asked if it had ever thought of sharing its excess earnings with the government in accordance with the recapture clause. Mr. de Gersdorff said that the company expected to pay but had not yet reached an agreement with the commission as to the amount due.

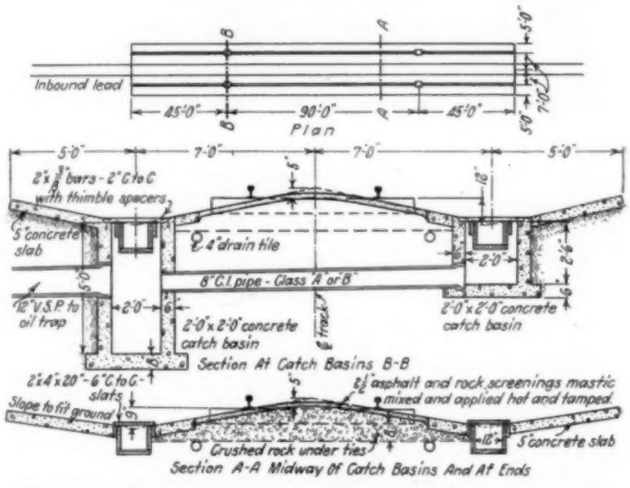
Commissioner McChord asked what is to become of the weaker lines that Congress had in mind when it enacted the transportation act, if "these voluntary consolidations of the more prosperous lines go on." Mr. de Gersdorff replied that that is a broad question but that if prosperous systems are allowed to be built up and allowed to earn enough it may become possible for them to acquire the weaker lines which they could not afford to buy without having first been strengthened themselves. Reference was made to the Kansas City, Mexico & Orient and the Kansas, Oklahoma & Gulf. As to the first he said with a smile that if the Orient succeeds in getting what it is asking of the commission (in the divisions case) the Missouri Pacific might be glad to buy it. The Kansas, Oklahoma & Gulf would be of no use to the Missouri Pacific now, he said, but if the system proposed in the application were authorized the road might become useful to it. "Why don't you take it now?" asked Commissioner McChord. "Because we would have to pay for it and don't want to bite off more than we can chew," replied Mr. de Gersdorff, who added that there had been some negotiations toward that end.

In explaining how the Gulf Coast Lines and the International-Great Northern would help the Missouri Pacific Mr. de Gersdorff said that it needed lines into southeastern Texas and to the Mexican border, whereas it is now bottled up, and that the extension of the system would put it in a position to compete with the Southern Pacific.

The commission has already permitted it to acquire a half interest in the Denver & Rio Grande Western on the west and it now desires access to Mexico and the Gulf. He said that the great improvement in the Missouri Pacific since L. W. Baldwin became president and got back much business that it had lost had put it in a position to be able to expand and that the company ought to be able to earn $6,000,000 over its fixed charges this year as compared with a deficit last year. Mr. de Gersdorff said that the Gulf Coast Lines ought to earn enough to carry the 7 per cent interest on the $18,000,000 notes issued by the Missouri Pacific in payment for the stock and also enough for the sinking fund to retire the notes at maturity. Other phases of the case were presented by T. J. Freeman, general solicitor of the Texas & Pacific and Frank Andrews, general counsel of the Gulf Coast Lines.

An Engine Washing Platform

SEVERAL ENGINE washing platforms of the design illustrated have been in operation on the Southern Pacific for the past two or three years, greatly facilitating the work of cleaning locomotives and enabling this work to be done over the platform before locomotives are taken into the enginehouse. Details of the design are shown in the drawing. These platforms are located on inbound turntable leads adjacent to the oil and water columns and sand house. On going to the roundhouse after being cut off from incoming trains, engines are taken in over this lead, filled with oil,


Inbound lead
45'0"
90'0"
45'0"
Plan
5'0"
7'0"
7'0"
5'0"
2"x8" bars - 2" C to C with thimble spacers
5" concrete slab
4" drain tile
8" C.I. pipe - Class A or B
12" V.S.P. to oil trap
2'0" x 2'0" concrete catch basin
2'0" x 2'0" concrete catch basin
Section At Catch Basins B-B
2"x4"x20" - 6" C to C slats
Slope to fit ground
2" asphalt and rock screenings mastic mixed and applied hot and tamped
Crushed rock under ties
5" concrete slab
Section A-A Midway Of Catch Basins And At Ends

Details of Engine Washing Platform Used on the S. P.

water and sand, and washed. They are then taken into the roundhouse for inspection and preparation for the next trip.

Permanent hydrants are located at convenient intervals along both sides of the washing platform to which hose may be attached. The hydrants are connected with pipelines to the elevated hot water tank of the boiler washing and filling plant wherever such plants are used as a part of roundhouse facilities. As this water is heated by exhaust steam from compressors, pumps and engine blowdowns, there is practically no expense in furnishing hot water to the washing platforms. An engine can be given a thorough cleaning in little more time than required to take on oil, water and sand and there is practically no additional delay on account of the washing. This arrangement saves much work after the engines come into the roundhouse.

In warm climates where there is no difficulty due to snow and ice these outdoor platforms can be used the year round. They would not, of course, be as well suited to northern climates. The length of the platform is governed by the sizes of locomotives used and local conditions.

The design of engine washing platform illustrated was developed on the Southern Pacific under the direction of H. M. Lull, chief engineer, Houston, Texas.

South Africa's Effort to Make Branch Lines Pay

Lines Serve Areas of Sparse Population—Experiments With Novel Forms of Motive Power

By G. E. Chittenden

THE NON-PAYING BRANCH line presents one of the most interesting problems of railway management today. In well-settled and large producing countries the economic factor with regard to branch services may not loom very large, but in young, developing countries like South Africa, where the construction of new railways is essential for opening up great areas of land capable of production on a large scale, the whole policy of branch line construction and operation is one of major importance.

The Problem in South Africa

The Union of South Africa, including the mandated territory of South West Africa, comprizes 800,000 square miles of territory (over one-fourth of that of the United States). According to the latest estimated census this area is peopled by 1,600,000 Europeans and 5,800,000 colored persons and natives—a total population of 7,400,000, which gives the low average of only two Europeans or about nine inhabitants of all races to every square mile of territory. In any larger consideration of actual settlement and development, however, only the European population can be taken into account.

At present the country is served by approximately 12,000 miles of railways, of which the South African Railways & Harbors Administration operates 11,750 miles, inclusive of about 650 miles of private lines. On an average, therefore, there are about 1½ miles of line to every 100 square miles of territory, 75 miles of line per 10,000 head of European population and about 16 miles of line per 10,000 head of European, colored and native population combined.

Railway Position in South Africa Today

While these rough statistical relationships between area, number of inhabitants and mileages of lines reveal to some extent the comparative sparsity of population and settlement in South Africa, and so afford a general indication to the conditions affecting the transportation business, particularly over branch lines in rural areas, they are misleading in their bearing upon the railway position as a whole, which is, of course, the real basis for an examination of the branch line problem in South Africa and any consideration of the measures which are being taken to solve it. On December 31, 1923, the general railway position in South Africa was as follows:

Open mileage (Government owned)	11,105
Total investment	£111,310,372
Gross receipts (1923)	£21,391,532
Gross operating expenditure, including depreciation, etc.	£15,906,045
Interest on capital	£4,053,194
Net	£1,432,293
Percentage return on capital	5.2%
Passengers carried (number)	64,442,041
Revenue-earning traffic (tons)	18,441,135
Train mileage	37,217,806

On December 31, 1923, the accumulated deficit of the South African Railways & Harbors Administration stood at £2,220,511. Since 1922 a policy of economy has been applied under all heads, except in regard to expenditure on development works, and on April 1, 1924, the accumulated deficit had been reduced to approximately £750,000, with the prospect at the time of writing (June, 1924) that this remaining deficit will be overtaken by the end of the current year leaving the financial equilibrium of the railways completely restored by 1925.

The railway position in South Africa today is the more remarkable in the face of two important facts: First, that the principles of economy have been accompanied since 1921 by substantial and progressive reductions in rates and fares calculated to have entailed sacrifices of revenue amounting to about £3,000,000 per annum, and, second, that some twelve to fifteen million pounds sterling in the form of new capital have been provided since 1921 for development work, including 850 miles of new lines; 280 track miles of main line electrification; an extensive system of port and country grain elevators; doubling, strengthening and regrading of main lines; improved methods of operation, signaling and rolling stock control, more powerful locomotives and higher capacity passenger and freight cars, and a comprehensive scheme of harbor developments at the four principal ports, including outer works, new wharves, plant, equipment and one of the largest dry docks in the world.

Lines Develop Country

The South African Administration is, therefore, in an essentially sound position today and a considerable proportion of the development of the country combined with additional traffic which has come to the railways may be traced to the influence of the branch lines as a set-off against the losses sustained on them year by year.

Relative Position of Branch Lines

The relative position with regard to the more important branch services for which statistics were available on December 31, 1923, was as follows:

Number of branch lines	48
Open mileage	3,476
Capital investment	£16,747,361
Gross receipts (1923)	£1,417,522
Gross operating expenditure	£1,219,907
Interest on capital	£639,087
Net loss	£441,472
Revenue-earning traffic (tons)	2,505,553
Train mileage	3,071,882

It will be observed that although the combined mileage of the branch lines comprises nearly one-third of the total open mileage of the South African Railways, the volume of traffic conveyed over those lines in 1923, represented only about one-seventh, or roughly 15 per cent of the total tonnage of revenue-earning traffic handled, while the earnings derived from the branch lines represented about one-fifteenth, or 7 per cent, of the total railway earnings. During 1923, only five of the forty-eight branch lines in question showed a profit after payment of operating expenses and interest charges. Fourteen lines paid operating expenses only but not interest charges, and the remaining twenty-nine lines paid neither the full cost of operation nor interest charges. Losses were incurred therefore on the great majority of the branch lines, and the total deficit amounted to £441,472.

The Loss Analyzed

The loss in 1923 was noteworthy because it represented the net financial result of operating branch lines during a fairly normal year of internal development and following upon the application for some years previously of various

economies designed to bring down costs by means of reductions in operating and maintenance expenditure to bare necessities consistent with safety and efficiency; elimination of light and empty haulage; curtailment of train services; reductions in staff and overtime payments and many other economies. In this connection it is of interest to note that the expenditure on the branch lines has been kept under close review by a special Branch Lines Committee composed of technical, administrative and traffic officers, which has made a special study of the problem.

As a result of the various economy measures, the loss of roughly half a million pounds sterling in 1923 reflects a considerable decrease compared with the losses incurred in previous years, and from the broad view of expansion, the 1923 loss on the branch lines may be regarded as a reasonable outlay in return for the development and exploitation of new mineral, agricultural and other industrial areas which those lines have fostered, apart from additional traffic which they have brought to the main lines, particularly in the form of agricultural products.

From the railway standpoint, however, the existing scale of agricultural and industrial production in most of the areas served by branch lines is not sufficiently intensive yet to make the branch lines payable undertakings, especially as all agricultural and certain industrial products, as well as machinery and commodities required for agricultural purposes, are carried at very low tariffs in order to foster the development of the inland areas in accordance with the special provisions of the Act of Union, under which the four large provinces of South Africa were unified in 1910.

The natural and lasting solution of the branch line problem is to be found, of course, in closer settlement and increased production in the areas served by those lines, but at the present rate of development those conditions can only be arrived at gradually, and for some time to come many of the branch services will have to be regarded principally in the light of developing agencies.

It is this factor which makes the problem so interesting in South Africa. As a government department the Railway Administration is not only called upon to build developing lines and encourage agricultural and industrial production by means of low rates, but also to operate the railways on business principles with regard always for the special provision of the Act of Union.

Branch Construction Policy

Out of this a definite policy in connection with the construction and operation of branch lines has slowly crystallized. In the first instance the lines are usually constructed as light railways, that is to say, they are built as far as practicable of second-hand materials released from the relaying of main lines or older branch lines on which traffic has developed and given rise to the need for heavier tracks. In this manner consistent improvements have been made in the standard of the permanent way, and although new materials, principally 45 lb. and 60 lb. rails, are often used for branch lines, it is the settled policy to keep down the capital cost as far as possible by utilizing second-hand or released materials.

In the latest program of branch line construction authorized in 1922, which is now approaching completion, the average capital cost for 851 miles of lines works out at just under £5,000 per mile. Similarly, the average capital cost per mile of the principal branch lines in the country (i. e. 3,476 miles at a total capital cost of £16,551,000) works out at much the same figure, which confirms the statement that the policy in South Africa has been to construct developing lines at the most economical figure and to avoid handicapping them from the outset with excessive interest charges on unnecessarily high capital costs.

So far as revenues are concerned, the branch lines are credited with 10 per cent of the earnings on all traffic accruing from them to the main lines after terminal and cartage charges have been met. The balance of the earnings derived from branch line traffic is then divided on a mileage basis in which the branch lines participate as well. In every vital respect, therefore, reasonable allowance is made to enable the branch services to pay their way as developing mediums, and the experience of the past few years, coupled with the increasing demands for developing railways, has focused more and more attention upon this question, especially from an operating point of view.

The Rail Motor Car

For a considerable time past the possibilities of operating branch services by means of rail motor vehicles have attracted wide attention. Varied experience with these forms of transportation has been gained, but it cannot be said today, after some years of practical experiment and investigation in South Africa that final assurance of operating success, from the orthodox railway point of view, has attended the numerous trials of rail cars under traffic conditions. It is much too early, however, to pronounce any verdict either in favor of or against the rail car as a factor suitable for economic service on branch lines in South Africa. They have proved successful up to a certain degree, but as units for dealing with passenger and freight traffic economically on grades of 1 in 40 to 1 in 60 and the severe curvature characteristic of so many lines in South Africa, no particular type of self-propelled rail car has so far proved a really sound commercial proposition capable of the sustained haulage effort and reliable service of the ordinary steam locomotive or the modern electrified units.

Experiments With Motor Cars Continued

At the present time various improved types of rail cars are being tested in service or are shortly to be tested on branch lines in South Africa. These include light gasoline units, and also larger units of 50 to 80 horse-power, a special feature of the latest vehicles being a high ratio of horsepower to weight, or the reduction of tare weight to the lowest limit, for the purpose of maintaining speed and hauling power on the more heavily graded lines. Tractors and steam rail coaches are included among these types, but although most of the vehicles represent up-to-date designs based on considerable experimental knowledge, technical and operating opinion is divided on the question whether the rail car is the light unit that will solve the problem of cheap, quick and reliable transport for the economical operation of branch lines, with their variable traffic and under the conditions peculiar to the country.

Only One Man Used on Motor Cars

The rail car certainly has the advantage that it can be manipulated by only one operator, who can also fulfil the role of trainman, but up to the present lack of flexibility and comparatively high maintenance costs appear to be the chief economic factors militating against the commercial success of these units from the standard railway operating point of view.

Wide research is being carried on into the possibilities of evolving a type of motive unit for railway purposes that will combine the many advantages of the rail car, carry and haul payable loads, give frequent and reliable services and yet prove less expensive in capital cost, upkeep and operation than the ordinary steam locomotive and train.

A New Type of Internal Combustion Engine

Recently a notable advance has been made in a new direction on the South African Railways with a type of electric suction gas producer locomotive which utilizes smokebox char or the waste products of steam locomotives as fuel.

This unit has been developed by one of the Administration's technical officers, Mr. Lawson, superintendent mechanical. Briefly described, the rough plant with which experiments have been conducted up to the present, consists of a generator for producing hydrogenated producer-gas fed to a six cylinder 100 h. p. internal combustion engine coupled up to a direct-current dynamo which serves two 50 h. p. electric tramway motors. This experimental unit, constructed partially of scrap materials and weighing about 32 tons, has been in service for several months hauling a light coach for passenger and parcels traffic. The operating costs, including interest and depreciation charges, have worked out at a very economical figure and the average loads hauled have proved satisfactory. Continued experiments with the electric gas producer unit in actual operation under traffic conditions on one of the branch lines have proved sufficiently promising to justify the South African Railway Administration in proceeding with plans and designs for a 400-500 horse power unit of a similar type which is at present on order. The results of operation with the gas producer locomotive give great promise that it may be developed into a suitable unit for the more economic operation not only of branch lines but also of some of the lesser trunk line services.

The "Roadrail" System

In connection with the investigations into cheaper forms of transport in relation to the branch line problem, the South African Railway Administration is also trying out the Stronach-Dutton "Roadrail" system for operating light feeder lines. This form of transport has been developed by another of the administration's technical officers, F. Dutton, superintendent of motor transport. The Roadrail system consists of a light railway operated by a steam or gasoline driven tractor with driving wheels that run on a prepared ground surface or strips of earth track on each side of the rails which carry the loaded cars. The chief virtue claimed for the system is that it takes advantage of the low tractive resistance of rail cars, while the motive unit benefits by the high tractive effort of its rubber shod driving wheels operating over a ground surface. The construction, operating and maintenance costs are low and the system is said to be specially suitable for transport in hilly country where grades and curvature are severe. The tractor itself is adaptable for use either as a rail or a road vehicle, and can be utilized both as a motive unit on the roadrail and as a vehicle for transporting products between the roadrail and adjoining farms. The system aims at providing light feeder communications between producing areas and main or branch lines. The South African Administration had it under experimental test some years ago. In view of its possibilities and in order to test it thoroughly the Administration has lately constructed a 20-mile section of Roadrail to serve a farming community in the Northern Transvaal and at the same time to put the system to a practical trial under traffic conditions. The capital cost of the 20 mile section, including wheelways and a 2 ft. gage track, works out at about £15,000, that is about £750 per mile or a total cost of roughly £21,000 including rolling stock. The service will come into full operation during the present year, and if the general results come up to expectations further extensions of the roadrail system may be considered in other areas where transport services are urgently required.

Road Motor Services

As an adjunct to its branch line railway services and in conformity with the general policy of providing transport facilities in developing areas, the South African Administration operates a number of road motor services to carry passenger and freight traffic in outlying districts instead of providing branch lines. The financial results of operating the road services generally have not been favorable, but in certain instances they have proved a commercial success and are more than paying their way, in addition to proving beneficial factors in aid of development and by bringing traffic to the railways. Extensions of road motor services are being made both in rural and urban areas and this form of transport promises to develop more and more.

Organized road motor services on any extensive scale in South Africa, particularly in rural areas, are handicapped to a great extent by road problems. The construction and maintenance of roads are functions of the provincial or local authorities, and the absence of good highways has, generally speaking, limited greater enterprise with regard to these services. For the Railway Administration the road question is wrapped up in the larger problem of branch services and the provision of light transport facilities in developing areas that will serve as feeders to the railway. What is required and must be arrived at in time is a co-ordinated policy in relation to roads and motor services in rural areas and also in the larger urban areas where private competition by highway motor vehicles has lately encroached very considerably upon traffic, principally freight and express, that formerly came to the railway. There are many indications that road motor services will play an increasingly large part in transportation developments in South Africa as time goes on.

Agriculture Shows Continued Prosperity

NOT IN FIVE YEARS has the United States presented so nearly a picture of balanced prosperity as it does now, declares A. B. Genung, agricultural economist for the United States Department of Agriculture, who has just completed a tour of the leading agricultural sections of the country. It may be that for a considerable period agriculture will stand at some disparity with urban industry, but for the moment agriculture is swinging toward par, and the readjustment is a healthy one for the country, Mr. Genung says.

"Go into the South this fall and you will be impressed with its prosperity. Last year went a long way to wipe out the pressing burden of indebtedness. Another cotton crop bringing one and a half billion dollars cash, plus a fairly good season with truck crops, potatoes, rice and small fruits will put the South into very comfortable position. General sentiment through the region is distinctly optimistic.

"In the East, meaning essentially the dairy and diversified region, things are not materially different from last year. Dairymen are beginning to feel the pressure from higher prices of grain feeds. Milk prices have stayed at rather discouraging levels; butter, however, has held pretty well to a price level which maintains production. Through the market milk sections there are apparently fewer heifer calves than a year ago, indicating a probable tendency toward somewhat lighter production. The East is in good shape as to feed crops, such as hay, silage corn, and oats, and it is doing fully as well as last year with the leading money crops such as potatoes, apples, etc. Altogether, the East is going into the winter on about the same basis as the last two years. The prevailing frame of mind among farmers is rather static. Men find little to be enthusiastic about.

"Farmers in the Corn Belt are in better spirits than for four years—not so much from any great increase in income as from a feeling that the stage is being set for better times. At last the hog situation is coming out from under its burden of overproduction, which in turn represented an effort to work off the corn surplus of 1920-21. Corn prices are up and the expectation is that hog prices are going to ride at

higher levels during the coming year. The corn outlook is bad enough. Frosts have hit the North. A heavy percentage of corn will certainly be soft and one of the Corn Belt's real farm management problems this fall is how best to dispose of the soft corn. Notwithstanding the poor corn crop, the Central states are obviously breathing easier than they have along back.

"The Wheat Belt is in infinitely better shape than for four years. Yields are splendid, the crop of high quality, and prices improved just at harvest time. In the Western spring wheat territory, where no one has had a new pair of shoes since the winter of 1919-20, there is particular rejoicing. All through the wheat country growers have hustled grain to market and new money is circulating rapidly in the process of paying debts. Men are inclined once more to regard the wheat country as good property.

"The situation in the range country is somewhat mixed in that sheep men and growers of grain and many irrigated crops are in very fair shape while cattle men are just the reverse. Sheep are everywhere in favor and flocks increasing, except in certain local areas where drought has cut the feed. The cattle situation remains an enigma. It has been a four year story of liquidation, which still continues. In spite of this—even of the continued selling off of breeding stock, there are a lot of cattle left in the range country. Old, long-headed operators are not lacking who believe that the industry has hit bottom and that this is the time to begin stocking up, and they are doing so to the tune of thousands of head. So far as this year's income goes, however, it may be tersely said that sheep have made money and cattle have lost money. The ranges are in good shape and winter feed abundant, generally speaking, everywhere east of the Continental Divide.

"The Pacific Coast has been seriously hurt by drought and to a lesser degree by frosts and the foot-and-mouth disease. Feed is short and the livestock situation is certainly no more favorable than last year. Grain yields turned out better than were expected earlier in the season and of course the higher prices have cheered such growers. Many of the deciduous fruits have suffered in yield and quality from the drought. However, the coast, taken altogether, produces a tremendous diversity of things and it will never be without an income. It may not be wide of the mark to say that the coast country is in just fair condition this fall, but, on the whole, does not seem in quite as good shape as one year ago."

Joint Committee Presents Specifications for Concrete

THE STANDARD SPECIFICATIONS for concrete and reinforced concrete prepared by the Joint Committee created to draft these specifications was submitted to the constituent organizations under date of August 14, 1924, and has now become available in printed form through its publication in the Proceedings of the American Society of Civil Engineers for October, 1924. The Joint Committee was organized in January, 1920, with representation from the American Society of Civil Engineers, the American Society for Testing Materials, the American Railway Engineering Association, the American Concrete Institute and the Portland Cement Association. It is the successor to the Joint Committee on Concrete and Reinforced Concrete organized in June, 1904, which presented its final report on July 1, 1916. The present report supersedes the tentative report of the present committee issued in June, 1921.

While the report as now published does not state specifically that it is the final report of this committee, the presumption is that it is intended as such, subject to modification only as to specific clauses. In addition to the specifications for materials, workmanship and design covering 51 pages which represent the work of the committee itself, there is appended a series of other specifications for materials, workmanship and tests covering cement, reinforcing bars, standard methods of conducting tests, etc., taken from the standards of the American Society for Testing Materials.

While the specifications for material and workmanship follow the general form of the specifications for concrete and reinforced concrete adopted by the American Railway Engineering Association in 1920, with considerable evidence that the joint committee made extended use of the A. R. E. A. specifications, the new specification embraces many marked departures from the older one. Thus, it is clear that the members of the joint committee were visualizing building construction and the problems encountered therein, in their consideration of the various clauses to the almost entire exclusion of any thought of the special problems encountered in bridge construction. This tendency is even more pronounced in the specifications for design wherein all of the more minute provisions are those relating primarily to conditions encountered in building work.

Recognize Modern Developments

Another characteristic of these new specifications is that they embody a distinct recognition of modern developments in concrete construction practice. The specifications provide for specific application of the slump and colorometric tests, while the clauses covering proportions clearly recognized the necessity for deviations from the arbitrary proportioning of the concrete with normal variations in the aggregates received on the work. However, in introducing these and other innovations, the specifications have been designed in a manner which permits the user a considerable degree of latitude in applying them to the particular job.

Under the general heading of materials, coarse aggregates are specified as consisting of "crushed stone, gravel or other approved inert materials," no specific mention being made of slag. Alternate provisions for reinforcing bars provide for the use of either billet steel bars or rail steel bars, but in a footnote the committee indicates its preference for billet steel.

The clause for machine mixing specifies one minute as the minimum time of mixing and definitely requires that the mixture be equipped with locks on the water measuring device and the discharging lever. The fact that the mixer is now of almost universal application is indicated by the brevity of the paragraph devoted to hand mixing.

The clause covering the minimum temperature (40 deg. F.) of the concrete at time of placing also specifies that it shall not have a temperature in excess of 120 deg. F. The chuting of concrete, which is ignored in the A. R. E. A. specifications, is covered specifically by the Joint Committee but instead of specifying a minimum slope for the chute in the clause devoted to this subject an appended footnote states that 27 deg. is considered the minimum slope permissible. Waterproofing is disposed of by three short paragraphs in which the only specific provision is that "integral compound shall not be used unless specifically authorized by the engineer." Following specifications covering the placing of concrete in sea water a number of short clauses are devoted to concrete in alkali soils or water, a subject which has received little attention in previous specifications.

The section on design specifies unit stresses in terms of percentages of the ultimate compressive strength of the concrete at 28 days, based on tests of 6-in. by 12-in. cylinders or 8-in. by 16-in. cylinders. In general, the percentages given permit higher designing stresses than those which railway engineers have considered conservative practice in the light of normal variations in the quality and strength of concrete made under normal field conditions.

How Department of Commerce Has Helped American Industry

THE RECORD of the results obtained through the work of the United States Department of Commerce during the past three years is a remarkable demonstration of assistance to American industry. This result has been brought about primarily through efforts to make the work of the department more practical and to bring its activities closer to the needs of business. Under the leadership of Secretary Herbert Hoover, the personnel of the department has been greatly strengthened, new activities undertaken and old ones advanced. Not the least practical evidences of the results received is the rapid increase in the number of requests for information and service.

A general outline of the work that has been done contains reference to the following expansions of department activity:

The work of the Bureau of Foreign and Domestic Commerce has been reconstructed and greatly expanded on a new basis of expert specialized attention to specific groups of commodities instead of the purely geographical and technical basis that formerly obtained. New activities of all sorts have been undertaken.

Sixteen commodity divisions have been created through which close co-operation has been established between the Bureau and trade associations and which are now working hand in hand with more than 75 committees selected to represent industries and other economic interests.

The business secured as a result of Bureau replies to 3700 individual inquiries from business firms showed an average return of $427 per inquiry.

The Division of Commercial Laws compiles and supplies information covering all legal phases of trading abroad.

A Domestic Commerce Division has been organized, enabling the Bureau for the first time to live up to the second part of its name. This division conducts researches on general problems, striving to assist distributors to eliminate wasteful practices and cut down costs.

The Foreign Service has been greatly expanded and the overseas personnel reorganized and increased.

Forty-three co-operative offices or service stations have been located in the larger industrial and commercial centers of the country, which are now handling an average of 34,431 inquiries a week.

Statistical Service

Several new and valuable forms of statistical service have been introduced. "Commerce Reports" and other publications have been improved. Publication of a "Commerce Yearbook" has been undertaken, as has a new series of publications called "Trade Information Bulletins."

Demands on the part of business men for the services of the department have increased by leaps and bounds. Commercial inquiries answered by the Bureau and its district and co-operative offices in the fiscal year 1924 totaled 1,236,326, an increase of 131 per cent in the last two years.

Simplified Practice

The Division of Simplified Practice, established in 1921, assists producers and consumers in mutual efforts to eliminate waste in production and distribution and has assisted in eliminating superfluous and unnecessary varieties in sizes and dimensions in many fields, thus reducing the accumulation of excessive stocks of little used sizes.

The Bureau of Census is now publishing a biennial census of manufactures. A campaign was inaugurated to demonstrate to manufacturers the value of industrial statistics and enlist their co-operation in securing prompt returns. Summary statistics for most of the manufacturing industries are now made available to the public in less than a year from the completion of the canvass. The compilation of monthly, quarterly or semi-annual production data is being rapidly expanded with a view to furnishing current statistics reflecting the business movement of the country. Current production statistics now cover nearly all key commodities. A monthly "Survey of Current Business" has been established and now has a paid subscription list of over 9,000. During the fiscal year 1923-24, 1,027 preliminary reports or announcements were issued.

Bureau of Standards

The usefulness and scope of the Bureau of Standards has been greatly extended. A complete revision of government specifications is under way. In co-operation with the industries of the country the Bureau is assisting in the great problem of eliminating waste. It has assisted in the preparation of specifications, codes, and ordnances, all having for their primary purpose the increasing of industrial efficiency.

The Bureau of Fisheries has made rapid strides in establishing public confidence in its work, in the development of a national fisheries program, and in the concentration of its efforts on the more pressing practical problems of fisheries.

Through the Bureau of Navigation the Department has dealt with the numerous new problems incident to the rapid developments in the field of radio. Annual conferences have been held at which all the various radio interests are represented for general discussion and agreement as to the manner in which radio activities are to be conducted. Secretary Hoover refers to this as "an experiment in industrial self-government."

Unemployment

Activities resulting from the Conference on Unemployment in 1921 led to the employment of from one and a half to two million. The report of its committee on Business Cycles and Unemployment did much to curb the beginnings of a dangerous boom in the spring of 1923. Since the report of the committee on Seasonal Operation in the Construction Industries the Association of Railway Executives has set in motion a program for eliminating seasonal employment in the railroad service.

The Lighthouse Service during the past three years has developed and applied radio fog signals to navigation, improved the mechanism for identification of aids to navigation by mariners and developed appliances for the automatic operation of lights and fog signals. Large economies in operation have been effected by the use of automatic lighting and fog signal appliances.

A Conference on Street and Highway Safety has been called by Secretary Hoover, to be held in December, with a view to the development and application of a distinct national policy of street and highway practice, which will serve as an accident prevention program and increase the usefulness of streets and highways. Eight committees including 150 outstanding men and women representing various groups of interest are now at work on various phases of the work preliminary to the conference and the organizations have agreed to set up a joint committee with the Secretary of Commerce to carry out the program and continue the scheme of co-operation.

Stabilization of Coal Industry

Significant progress has been made toward stabilizing the coal industry. Efforts to encourage coal storage have resulted in lightening the burden placed on the railroads at seasons of maximum car movement which has tended to keep down prices to the consumer and to eliminate hardships from seasonal buying and car shortage. The department has been active in efforts to encourage the making of wage agreements to run for long periods.

As chairman of the Colorado River Commission Secretary

Hoover brought about an agreement upon a plan for the equitable distribution of the waters of the Colorado River, the ending of state conflicts and the adjustment of future disputes.

Secretary Hoover has consistently been the champion of the legitimate trade association.

Under Secretary Hoover the Department of Commerce has done much to stabilize the building and housing situation.

Hopper Lock for Car Toilets

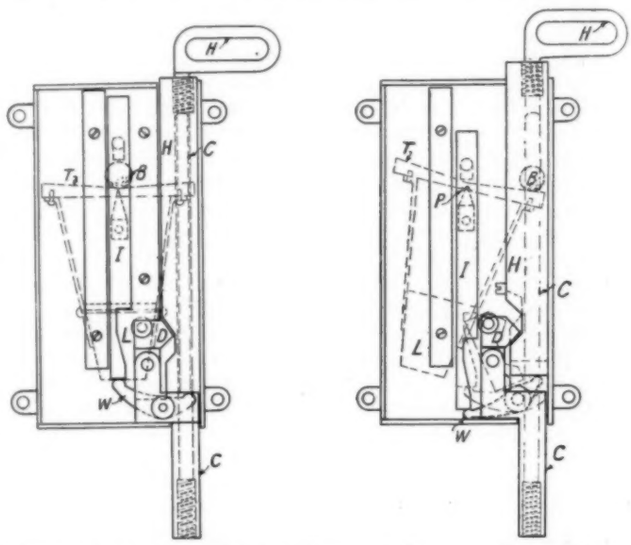
A RECENTLY patented hopper lock for car toilets has been tested under service conditions over a period of several months, apparently demonstrating its practicability and value for the purpose intended. The device is designed to prevent the dumping of hoppers except when cars are in motion and thus obviate the necessity of locking toilet doors at stations with resultant inconvenience to passengers and expenditure of time and labor on the part of train crews who must give attention to this matter.

The device depends for its action upon the side sway of the car and is so arranged that up to a speed of about 15 miles an hour movement of the operating handle will not dump the hopper. Above that speed the hopper may be dumped as usual by means of the handle and hand lever. The tests referred to are said to have shown the device to be thoroughly reliable in operation.

The new hopper lock, shown in the drawing, is attached to the inner wall of the toilet just under and in line with the hand lever. It is equally adaptable to single or double pan hoppers. In the latter case, the loop or ear on plunger *H* is attached with a special clamp to the pull rod from the handle to the top hopper pan. From the bottom of the device a second plunger *C* is attached to the pull rod leading to the bottom hopper pan. With this arrangement the top hopper dumps every time the hand lever is operated but the bottom hopper operates only when the car is in motion and the sway releases the locking mechanism.

In construction the hopper lock consists of an outside shell or housing made of nickel plated sheet brass, the dimensions being 3 in. by 3 in. by 6 in. The inside locking mechanism consists of brass or bronze die castings, a balancing table *T* with lead pendulum *L*, supported on a pivot point *P*. An ordinary 9/16 in. steel ball bearing *C* is used to prevent the dropping of tumbler *I* which, through the movement of walking beam *W* and dog *D*, either locks or releases plunger *C*, connected to the bottom hopper pan.

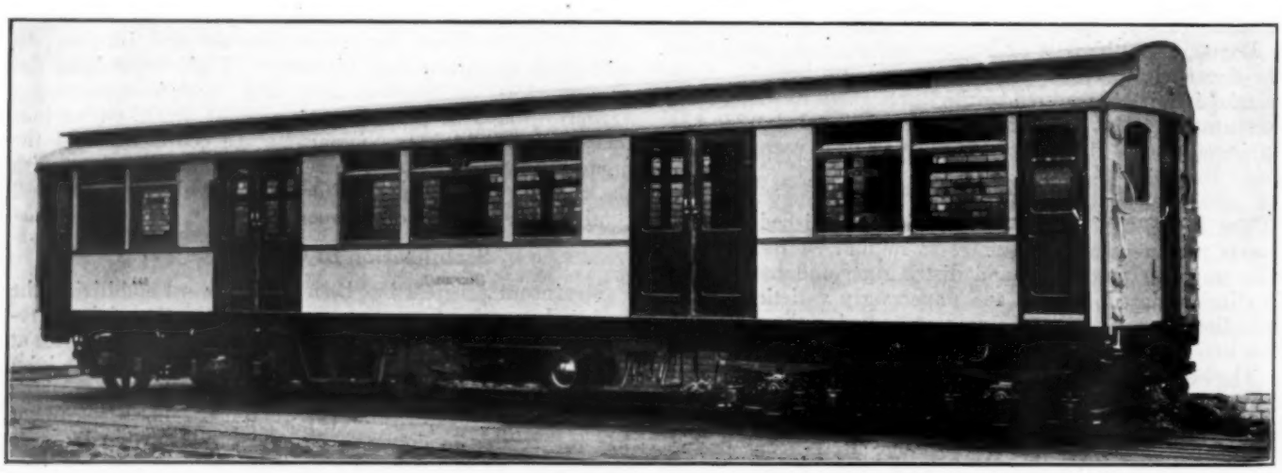
Without going further into the construction of the device, its operation is briefly as follows. Ball *B* is held against longitudinal movement in the direction of the car, due to abrupt starts, stops and speed changes by means of two permanent stops. With the car stopped and ball *B* centrally located over the pivot, the arrangement of the locking mechanism is such that plunger *H* will raise with the operation of the hand lever, dumping the top hopper but plunger *C* will be held fast and prevent the dumping of the bottom hopper. When the car has reached a certain speed, which is usually about 15 miles an hour, there is sufficient side



Hopper Lock Actuated by Sway of Car; Locked Position (left), Unlocked (right)

sway of the car to set table *T* with its lead counterweight *L* swinging and displace ball *B* to the position shown at the right in the drawing. In this position, the locking mechanism which held plunger *C* is released and both hopper pans operate just the same as if no hopper locking device were applied.

The hopper locking device described is the invention of H. G. Anderson, formerly a porter with the Pullman Company. It is being manufactured by the Adapt Machinery Company, Chicago.



Motor Car Built by the Gloucester Railway Carriage & Wagon Company, Ltd., for the London Underground Railways

General News Department

The Southern Pacific's Sunset Limited running between New Orleans and San Francisco, now is made up of new steel cars.

The Canadian National is negotiating with representatives of its enginemen and firemen concerning the effect on the seniority of the employees of the amalgamation of the former Canadian National Railway and the Grand Trunk.

The American Association of Passenger Traffic Officers held its annual meeting in New York city on October 2 and 3. W. B. Calloway, passenger traffic manager of the Baltimore & Ohio, was elected president for the ensuing year, and L. W. Landman (N. Y. C. and M. C.), vice-president.

The West Virginia Northern, the line of which extends from Kingwood, W. Va., to Tunnelton, on the Baltimore & Ohio, 11 miles, has discontinued the operation of passenger trains, having been authorized to do so by the Public Service Commission of the state. It is the intention to keep the road in operation for the transportation of freight.

The Brotherhood of Locomotive Engineers and the Brotherhood of Locomotive Firemen & Enginemen have addressed communications to nearly all the western railways, asking that negotiations be reopened on their requests for wage increases. This case is now before the United States Railroad Labor Board, before which brotherhood representatives refuse to testify, so that the present move of the brotherhoods will probably be disregarded.

The Interstate Commerce Commission has issued its tentative valuation of the common carrier property of the Pennsylvania Company and its leased lines as of June 30, 1916, in which the final value for rate making purposes is placed at $30,135,000 for property wholly owned and used and $284,676,670 for property used, including leased lines—1,679 miles of line and 4,335 miles of tracks—in all capitalization on the valuation date was $200,253,081.

Gerrit Fort, vice-president of the Boston & Maine in charge of the traffic department, made a three-day inspection trip over the lines of the company, last week, accompanied by a party of his lieutenants, visiting the principal industrial centers. The party consisted of about 30 general and district agents, including those in charge of the agencies recently established by the road in New York, Cleveland, Pittsburgh, Detroit, Chicago, Memphis and Kansas City.

J. F. Murphy, formerly general manager of the Missouri Pacific, has been appointed a permanent member of the Railroad Managers' Committee of the Train Service Board of Adjustment for the Western Region. His territory includes the states between the Chicago-New Orleans line of the Illinois Central and the Pacific coast. Mr. Murphy was elected to the position by a nominating committee composed of representatives of the Union Pacific, the Chicago, Burlington & Quincy, the Chicago, Milwaukee & St. Paul, the Atchison, Topeka & Santa Fe and the Illinois Central.

Crow's Nest Pass Rates Too High for Manitoba

The appeal of the province of Manitoba against increases in railway freight rates granted by the Dominion Railway Board in 1917 will be heard by the Supreme Court of Canada at the sittings which open on October 14. The appeal is set down at the end of the Western cases and should be reached by October 25. The aim of the appeal is apparently to revive the Manitoba rate agreement between that province and the former Canadian Northern Railway, now a part of the Canadian National, which agreement provides for lower rates than those under the Crow's Nest Agreement.

It is probable that the eagerly awaited decision of the Dominion Railway Board on the application for the removal of the discrimination caused by the railways' limited enforcement of the rates under the Crow's Nest Agreement on its restoration on July 7 last will be rendered before the hearing of the Manitoba case before the Supreme Court and that an almost certain appeal, either by the railways or the shippers, from the pending judgment of the Railway Board will also be heard soon by the Supreme Court.

Eastern Car Service Officers

The Eastern Association of Car Service Officers held its annual meeting in New York City on September 25. A. E. Lock (T. H. & B.), was chosen president for the ensuing year and C. F. Merrill (L. & H. R.), vice-president.

Acting on the report of a conference held recently in Chicago, the association approved a proposal that a joint general meeting be held, at least once a year, of the four territorial associations; namely, the Northwestern Association of Transportation and Car Accounting Officers, the Southwestern Car Service Association, the Southern Association of Car Service Officers and the Eastern Association of Car Service Officers.

If the other associations take favorable action, it is proposed to hold the first joint meeting at Indianapolis, Ind., on Thursday, March 12. This joint meeting would take the place of the regular spring meetings of the four associations.

Examinations for I. C. C. Locomotive Inspectors

The United States Civil Service Commission announces that competitive examinations for the position of inspector of locomotives under the Interstate Commerce Commission, will be held throughout the United States on November 5 and 6, the purpose of which is to fill vacancies at an entrance salary of $3,600 a year. Appointees to these positions are allowed necessary expenses when absent from headquarters in the discharge of their official duties.

The duties of this position are personally to inspect locomotives and to see that the carriers make inspections in accordance with the Locomotive Inspection Law and the rules and regulations established under it, and other duties incidental to the administration of that law. Competitors will be rated on spelling, arithmetic, practical questions relating to the construction, testing, inspection, repair and operation of locomotives, their boilers and appurtenances; report writing; training and experience in railroad work, and general fitness. Information and blank applications may be obtained from the U. S. Civil Service Commission, Washington, D. C., or from the secretary of the board of civil-service examiners at the post office or customhouse in any city.

Illinois Central Loses Tax Suit

A decision against the Illinois Central was handed down by Judge Samuel C. Stough, of the Circuit Court at Ottawa, Ill., on October 7, in a long pending controversy over taxes claimed by the state from the railway company. The suit involves the payment of 7 per cent of the gross receipts on the 700 miles of chartered line owned by the Illinois Central in Illinois as required in the charters. It was alleged by the state that the company had credited disproportionately large amounts of revenue to its lines which were not chartered and on which general taxes were paid, with the consequent reduction in the earnings credited to the chartered lines. The decision of the court upheld the state's contention that the chartered lines should be credited with the same proportionate earnings per mile as the other lines of the company. The court also issued an order requiring the railroad company to make a new accounting with uniform credit of earnings on all lines, whether chartered lines in Illinois or lines connecting therewith.

The case has been before the court since 1908, when suit against

the company was brought by Attorney General Stead, of Illinois. In 1910 an effort was made to have the state Supreme Court take jurisdiction, but this was refused. The case was then referred back to Judge Stough for trial. Judge Stough has heard all motions and made all orders in the case for more than 16 years, the evidence requiring six years to present.

Another Truck Line for the P. R. R.

The Pennsylvania has established an automobile truck freight line between Ft. Wayne, Ind., and Lima, Ohio, 70 miles, with deliveries at all intermediate points, as an experiment to reduce operating expenses on l. c. l. shipments, and to give improved service. The freight will be delivered to and taken from the freight stations at the different points the same as before. The Brown Trucking Company, Ft. Wayne, has been awarded the contract to make the trip from Ft. Wayne to Van Wert and return each day, while the Lima Truck & Storage Company will operate from Lima to Van Wert and return.

Gaspe Railway Conditions to Be Investigated

A full investigation into the conditions existing on the Gaspe Railway and the means of improving them, if they prove unsatisfactory, is to be made by the Canadian Board of Railway Commissioners, according to an announcement made in Quebec City. Owing to the recent death of the board's chairman, Frank B. Carvell, the inquiry which was to have been made in August was delayed pending the appointment of a successor. Harrison A. McKeown, the new chairman, has, at the request of Rodolphe

OPERATING REVENUES AND OPERATING EXPENSES OF CLASS I STEAM ROADS IN THE UNITED STATES

(For 194 Steam Roads, Including 16 Switching Switchinng and Terminal Companies)

For the Month of July, 1924 and 1923

Item	United States		Eastern District		Pocahontas Region		Southern Region		Western District	
	1924	1923	1924	1923	1924	1923	1924	1923	1924	1923
Average number of miles operated...	236,107.75	235,767.22	59,508.29	59,345.18	5,458.84	5,449.49	38,354.21	38,449.81	132,786.41	132,522.74
Revenues:										
Freight	$339,904,755	$379,335,287	$149,943,812	$181,196,981	$15,431,882	$16,807,397	$43,922,447	$44,766,953	$130,606,614	$136,563,956
Passenger	a 97,371,697	b 107,506,240	49,099,564	52,842,848	2,105,923	2,392,893	11,751,510	13,497,416	34,414,700	38,773,083
Mail	7,828,618	7,580,074	2,999,819	2,748,338	195,868	181,551	1,110,622	1,129,570	3,522,309	3,520,615
Express	9,833,444	11,620,032	4,222,143	5,096,474	228,267	240,529	1,095,352	1,437,076	4,287,682	4,845,953
All other transp'r'n	15,894,167	17,052,403	9,113,811	10,312,162	186,710	192,556	805,262	824,569	5,788,384	5,723,116
Incidental	10,165,148	12,581,869	5,106,744	6,720,418	355,035	410,885	923,582	1,009,073	3,779,787	4,441,493
Joint facility—Cr.	793,838	847,412	349,689	374,212	12,761	17,051	132,471	129,396	298,917	326,753
Joint facility—Dr.	203,702	216,172	101,408	110,458	2,171	3,059	29,343	36,520	70,780	66,135
Ry. operat'g revs.	481,587,965	536,307,145	220,734,174	259,180,975	18,514,275	20,239,803	59,711,903	62,757,533	182,627,613	194,128,834
Expenses:										
Maintenance of way and structures...	73,104,591	76,556,558	30,355,608	32,978,240	2,986,055	2,604,934	9,262,636	9,932,847	30,500,292	31,040,537
Maint. of equipm't	99,416,191	121,902,373	46,666,915	60,927,353	4,504,837	5,190,236	12,862,431	14,429,984	35,282,008	41,354,800
Traffic	8,495,259	7,992,269	3,186,920	3,006,033	206,971	193,571	1,409,428	1,328,706	3,691,940	3,458,959
Transportation ...	171,438,982	191,571,164	81,087,848	93,455,379	5,568,700	6,365,946	21,713,844	23,498,924	63,068,590	68,250,915
Miscel. operations.	4,396,884	4,578,436	2,012,690	2,081,600	79,744	81,581	359,449	361,897	1,945,001	2,053,358
General	14,241,205	13,430,083	6,121,208	6,024,685	463,265	423,037	1,826,722	1,758,414	5,830,010	5,223,947
Transportation for investment—Cr...	1,183,779	1,085,179	132,500	111,525	56,392	42,454	104,040	99,334	890,847	831,866
Ry. oper'g exps.	369,909,333	414,945,704	169,298,689	198,361,765	13,853,180	14,821,851	47,336,470	51,211,438	139,428,994	150,550,650
Net revenue from railway operations	111,678,632	121,361,441	51,435,485	60,819,210	4,661,095	5,417,952	12,381,433	11,546,095	43,200,619	43,578,184
R'way tax accruals	29,052,013	28,662,474	12,465,091	12,974,869	1,201,181	1,017,888	3,400,520	3,245,985	11,985,221	11,423,732
Uncollectible railway revenues	173,359	116,607	75,067	41,620	7,403	4,575	21,203	11,551	69,686	58,861
Railway operating income	82,453,260	92,582,360	38,895,327	47,802,721	3,452,511	4,395,489	8,959,710	8,288,559	31,145,712	32,095,591
Equipment rents—Dr. balance	6,397,073	5,536,376	4,064,775	2,863,726	d 336,640	d 361,500	16,954	455,757	2,651,984	2,578,393
Joint facility rent—Dr. balance	1,968,511	2,110,678	1,052,215	1,236,764	98,627	146,117	136,222	124,342	681,447	603,455
Net railway operating income...	74,087,676	84,935,306	33,778,337	43,702,231	3,690,524	4,610,872	8,806,534	7,708,460	27,812,281	28,913,743
Ratio of expenses to revs. (per cent).	76.81	77.37	76.70	76.53	74.82	73.23	79.26	81.60	76.34	77.55
For Seven Months Ended with July, 1924 and 1923										
Average number of miles operated ...	236,003.56	235,770.74	59,491.93	59,311.76	5,459.57	5,448.63	38,355.91	38,440.89	132,696.15	132,569.46
Revenues:										
Freight $2,408,399,666	$2,651,007,553	$1,095,397,329	$1,268,118,865	$109,146,484	$108,622,894	$332,597,290	$348,502,481	$871,258,563	$925,763,313	
Passenger ..... c 626,381,829	e 646,669,124	301,138,160	307,562,227	14,408,097	15,220,439	87,328,736	89,733,696	223,506,836	234,152,762	
Mail	56,042,898	52,885,920	21,527,137	19,569,452	1,393,345	1,250,715	7,941,454	7,588,428	25,180,962	24,477,325
Express	80,601,357	89,042,261	35,767,688	41,691,959	1,826,444	2,027,109	11,331,099	11,088,624	31,676,126	34,234,569
All other transp'r'n	109,812,527	114,984,843	63,415,308	68,279,912	1,265,118	1,285,241	6,200,713	6,424,211	38,931,388	38,995,479
Incidental	67,446,505	76,226,409	34,551,212	41,556,694	2,373,213	2,501,785	7,626,932	7,793,918	22,895,143	24,374,012
Joint facility—Cr.	6,138,810	5,799,681	2,493,893	2,633,826	102,731	99,070	913,111	950,657	2,629,075	2,116,128
Joint facility—Dr.	1,484,060	1,554,911	740,460	806,554	15 891	26,519	212,226	222,184	515,483	499,654
Ry. operat'g revs.	3,353,339,532	3,635,060,880	1,553,550,267	1,748,606,381	130,499,546	130,980,734	453,727,109	471,859,831	1,215,562,610	1,283,613,934
Expenses:										
Maintenance of way and structures...	455,691,923	452,293,454	186,654,458	189,837,048	19,044,649	15,727,353	63,617,196	63,925,162	186,375,620	182,803,891
Maint. of equipm't	741,631,115	853,214,382	356,110,230	426,041,775	32,433,297	33,773 543	93,327,578	100,609,155	259,760,010	292,789,909
Traffic	57,565,620	53,844,866	21,557,825	19,868,049	1,431,559	1,316,494	10,057,225	9,722,811	24,509,011	22,937,512
Transportation ...	1,268,760,218	1,383,698,130	607,517,719	678,178,548	41,583,561	43,809,323	167,100,229	175,693.484	452,558,709	486,016,775
Miscel. operations.	28,841,281	29,046,791	13,799,338	14,222,078	598,832	585,590	2,953,822	2,775,994	11,489,289	11,463,120
General	98,839,424	93,934,934	43,618,129	41,911,285	3,092,160	2,834,450	12,771,340	12,289,093	39,357,795	36,900,106
Transportation for investment—Dr..	7,577,328	5,466,806	1,125,735	552,894	208,738	117,337	920,576	682,701	5,322,279	4,113,874
Ry. oper'g exp's.	2,643,742,253	2,860.565,751	1,228,131,964	1,369,505,889	97,975,320	97,929,425	348,906,874	364,332,998	968,728,155	1,028,797,439
Net revenue from railway operations	709,597,279	774,495,129	325,418,303	379,100,492	32,524,226	33 051,309	104,820,295	107,526,833	246,834,455	254,816.495
R'way tax accruels	190.529,294	189,401,777	78,866,443	79,410,210	8,295,255	6,741,237	23,574,538	23,271,353	79,793,058	79,978,977
Uncollectible railway revenues	1,239,874	927,045	580,971	423,907	23,695	50,644	115.296	79,081	519,912	373,413
Railway operating income	517,828,111	584,166,307	245,970,889	299,266,375	24,205,276	26,259,428	81,130,461	84,176,399	166,521,485	174,464,105
Equipment rents—Dr. balance	40,089,695	39,800,719	26,835,888	29,378,898	d 2,191,532	d 3,172,062	3,387,739	3,948,489	12,057,580	7,645,394
Joint facility rent—Dr. balance	12,061,666	12,584,096	5,954,390	6,514,653	709,980	830,233	721,083	603,162	4,676,213	4,636,048
Net railway operating income...	465,676,750	531,781,492	213,180,611	263,372,824	25,686,828	28,601,257	77,021,619	77,624,748	149,787,692	162,182,663
Ratio of expenses to revs. (per cent).	78.84	78.69	79.05	78.32	75.08	74.77	76.90	77.21	79.69	80.15

a Includes $2,277,443 sleeping and parlor car surcharge. b Includes $3,235,830 sleeping and parlor car surcharge. d Deficit or other reverse items.
c Includes $20,965,147 sleeping and parlor car sudcharge. e Includes $20,563,691 sleeping and parlor car surcharge.

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

Lemieux, speaker of the Canadian House of Commons and member for Gaspe, and Charles Marcil, decided to commence the investigation immediately. It is suggested that the Canadian National Railways take over the Gaspe line, but the C. N. R. is inclined to administer the Gaspe road without taking it over.

To Preserve and Improve Forests

A National Conference on Utilization of Forest Products will be held under the direction of Secretary Wallace of the Department of Agriculture in Washington, D. C., on November 19 and 20. The purpose of the conference is to obtain national recognition of the problem of perpetuating a supply of forest products sufficient to meet the needs of the nation and of the fact that better utilization of forest products ranks with forest protection and timber growing as one of three essential elements of an effective forestry program. The conference will also establish a nationally representative advisory committee to assist the Secretary of Agriculture in formulating and carrying out adequate measures to insure the most efficient development and use of the forest resources.

Speakers will be selected to present a comprehensive idea of the nature and extent of the present preventable and unpreventable wastes and to show how an enlarged program of research will develop further means of prevention. The Secretary of Agriculture has asked all associations and organized interests concerned in the conference to send delegates.

Clerks' and Station Men's Wages

The Railroad Labor Board began a hearing on October 8 on the dispute between the Brotherhood of Railway & Steamship Clerks, Freight Handlers, Express & Station Employees and 40 railroads located in all parts of the United States. As reported in the *Railway Age* of September 6, the roads involved in the present dispute are those which last spring denied the general wage increases asked by the clerks, the employees asking advances ranging from 4 to 16 cents an hour. Besides the officers of the brotherhood, representatives of the following roads were present at the hearing: the Atlantic Coast Line; the Boston & Albany; the Boston & Maine; the Buffalo, Rochester & Pittsburgh; the Chicago & Eastern Illinois; the Chicago & Western Indiana; the Chicago, Burlington & Quincy; the Chicago Great Western; the Chicago, Indianapolis & Louisville; the Chicago, Milwaukee & St. Paul; the Cincinnati, New Orleans & Texas Pacific; the Colorado & Southern; the Cupples station of St. Louis; the Denver & Rio Grande Western; the Denver Union Terminal; the Des Moines Union; the Duluth, South Shore & Atlantic; the Ft. Worth & Denver City; the Illinois Central; the Jacksonville Terminal; the Joplin Union Depot; the Kansas City Southern; the Kansas City Terminal; the Maine Central; the Michigan Central; the Minneapolis, St. Paul & Sault Ste. Marie; the New York, Chicago & St. Louis; the New York Central; the New York, New Haven & Hartford; the Northern Pacific; the Pennsylvania; the Pere Marquette; the St. Louis-Southwestern; the St. Paul Union Depot; the Southern Pacific, lines in Texas and Louisiana; the Terminal Railroad Association of St. Louis; the Texas Pacific-Missouri Pacific Terminal of New Orleans; the Union Pacific; and the Yazoo & Mississippi Valley.

Railroad Commissioners to Meet at Phoenix, Arizona

The National Association of Railroad and Utilities Commissioners is to hold its 36th annual convention at Phoenix, Arizona, beginning on Tuesday, November 11 and continuing four days. Headquarters will be at Hotel Adams and the meetings will be held in the State Capitol. The Arizona Corporation Commission and the Phoenix Chamber of Commerce have made elaborate preparations for excursions and other entertainments. It is proposed to make long automobile trips to Roosevelt Dam and to other places, and a railroad trip into Mexico.

J. B. Walker, New York City, secretary of the association, announces that an address is expected from Hon. Herbert Hoover. There will also be addresses by at least one member of the Interstate Commerce Commission and several members of the state commissions and by former presidents of the association, including Carl D. Jackson, Walter A. Shaw and Charles E. Elmquist.

Reports of committees scheduled to be presented to the convention will deal with public ownership and operation; safety of operation of railroads and public utility companies; service of railroads and public utility companies; express companies; rates of railroads and public utility companies; grade crossings; motor vehicle transportation; state and federal legislation; the proposed consolidation of railroads and other topics.

Three Years of Advertising

The Central of Georgia is publishing in the newspapers its 37th monthly advertisement devoted to giving its patrons information about the railroad, consisting of a review of its three-year publicity campaign. This advertisement says, in part:

"Our statements have been planned with the idea of taking the groundless mystery out of railroading. We have sought to develop better understanding by informing ourselves of our patrons' needs and wishes and by informing our public regarding the railroads. Our monthly statements have covered many phases of the railway business and we have endeavored to discuss all subjects in a simple, non-technical manner.

"We take pride in the belief that our statements have helped the people of our territory to become better informed in regard to this and other railroads. We believe there is much less prejudice against the railroads now than there was three years ago. We believe our citizens generally realize that it is more important to their own welfare to help the railroads through constructive treatment than to injure them through unconstructive regulation. We believe that we should be remiss in our duty as trustees of this great property if we failed to keep our public informed on railway matters. After three years of this work, we are convinced that our patrons understand and approve what we are trying to accomplish. * * *"

Wage Statistics for July

For the month of July, 1924, Class I railroads reported to the Interstate Commerce Commission a total of 1,773,114 employees, a decrease of 181,573, or 9.3 per cent, as compared with returns for the same month last year. The total compensation decreased $25,279,909, or 9.7 per cent. The changes in employment, by employee groups, are shown in a subjoined table. Owing to an increase in the number of employees in the maintenance of way group, the total number of employees reported for July, 1924, shows a slight net increase over that reported for the preceding month. There has been a reduction in the number of employees in the train and engine service group, month by month, since February of this year. The number reported for that group in July is the lowest since August, 1922.

The monthly earnings, by groups, were as follows:

Group	Monthly earnings of Employees reported on daily basis		Monthly earnings of Employees reported on hourly basis	
	July 1924	July 1923	July 1924	July 1923
Executives, officials and staff assistants	$437	$427	...	...
Professional, clerical and general	182	178	$125	$122
Maintenance of way and structures	241	238	89	92
Maintenance of equipment and stores	247	244	121	123
Transportation (other than tr., eng. and yd.)	98	97	125	122
Transportation (yardmasters, etc.)	264	259	153	148
Transportation (tr. and eng. service)	...	...	191	189

Increases or decreases in the number of employees, by groups, July, 1924, compared with previous month, and with July, 1923, were as follows:

Group	July, 1924, compared with June, 1924	July, 1923
Executives, officials, etc.	6	(d) 163
Professional, clerical and general	(d) 673	(d) 9,458
Maintenance of way and structure	5,787	(d) 34,262
Maintenance of equipment and stores	(d) 1,086	(d) 87,773
Trans. (other than train, engine and yard)	(d) 277	(d) 11,470
Trans. (yardmasters, switch tenders and hostlers)	(d) 47	(d) 2,406
Trans. (train and engine service)	(d) 1,161	(d) 36,041
Net increase or decrease	2,549	(d)181,573

Report on Long Island City Derailment

The Interstate Commerce Commission has issued its report on the derailment of a passenger train on the Long Island Railroad at Long Island City, N. Y., on July 30, in which one passenger was killed and 50 were injured. This accident was reported in the *Railway Age* of August 16, pages 298 and 303. The principal recommendation of the report is that the switch which was carelessly turned under a moving passenger train,

and which is located just outside of an interlocking plant, should be interlocked with the signals and operated from the tower. Traffic conditions on this road at this point "amply justify" this recommendation. Moore, the helper on the electric locomotive, who threw the switch under the train, was employed as a fireman in 1900; was made an engineman in 1907, and was demoted to helper in December, 1923. Towerman Hunt, who released the electric lock on the switch before the passing train had cleared it, had been a signal man since March, 1908, and had been in this tower six years. The only observation concerning the locomotive helper is that "he was unable to offer any explanation" for his action. The telegrapher in the tower, assistant to the towerman, had telephoned to Moore that he could turn the switch after the train should have passed, but this was contrary to the rule; he should have waited until it was safe to make the movement, before giving permission. Hunt is censured for silently acquiescing in the action of the telegrapher. The rule requires one passenger train passing another at this point to run no faster than ten miles an hour, but the inspector believes that this rate was exceeded. The report further finds that the men in the tower were not fully or correctly informed as to the rules and the use of hand-operated switches, and the management of cross-over movements.

Earnings of the Canadian Railways

A general contraction in export business, especially in grain and in commodities originating on their United States lines and connections, is now being reflected in the earnings of the two principal Canadian railway systems. In the earlier part of this year they both piled up substantial surpluses, but these are being eaten into in the past two or three months. The gross receipts of the Canadian National Railways for the first eight months of this year were $153,173,166, as compared with $158,491,711 in the same period last year, while a better showing was made by the Canadian Pacific Railway whose gross receipts for the first eight months of this year were $113,864,715, as against $112,940,453 in the same period last year. The decline in gross on the Canadian National was even more marked in September, making the total gross earnings for the nine months $172,484,625, a decrease of $7,652,942 under the same period last year. A similar decline in Canadian Pacific earnings is shown in September, that of the last week of that month being $5,481,000, as against a gross of $6,365,000 in the same week last year.

In August, on the other hand, the Canadian Pacific showed a gain in net earnings of $51,532, the net for August this year being $3,168,590 as compared with $3,117,535 in the same month last year. This showing was accomplished despite a decline in gross earnings of $2,093,003, when compared with August, 1923, and was made possible by a reduction in operating expenses of $2,144,535. Net profit for the month under review was the largest for any August since 1919.

For the first eight months of the present fiscal year, net profits are greater by $1,114,784 than in the corresponding period of last year, gross earnings being greater by $924,261, while operating expenses in that period are lower by $220,522.

Figures for August and for eight months are:

For August—	1924	1923
Gross earnings	$14,324,121	$16,417,124
Operating expenses	11,155,530	13,300,065
Net	3,168,590	3,117,059
For eight months—	1924	1923
Gross earnings	$113,864,715	$112,940,453
Operating expenses	97,966,478	98,187,000
Net	15,898,237	14,753,452

August operating results on the Canadian National Railways showed a decrease in gross earnings of $3,428,814 from the same month last year. Operating expenses, however, also showed a decrease of $2,132,407, leaving a decrease in net earnings of $1,296,407.

The aggregate gross earnings for the eight months show a falling off of $5,318,545.58, or 3.4 per cent, as compared with the corresponding period of 1923. Operating expenses during the eight months were reduced $4,166,672.37, or 2.7 per cent.

Net earnings for the period were $3,928,364.15, a decrease of $1,151,873.21, or 22.7 per cent, as compared with the first eight months of 1923.

Gross earnings, operating expenses and net earnings for the month of August and for the first eight months are:

August, 1924—Gross, $18,323,938; decrease, $3,428,814.91. Operating expenses, $17,610,254.26; decrease, $2,123,407.19. Net, $713,683.26; decrease, $1,296,407.72.

Eight months—Gross, $153,173,166; decrease, $5,318,545.58. Operating expenses, $149,244,801.05; decrease, $4,166,672,370. Net, $3,928,364.15; decrease, $1,151,873.21.

Program for Bridge and Building Convention at Kansas City

The American Railway Bridge and Building Association will hold its thirty-fourth annual convention at the Baltimore hotel, Kansas City, Mo., on October 21, 22 and 23. A considerable number of the members of this association will travel from Chicago to Kansas City by a special train on the Santa Fe, leaving Chicago on Monday morning, October 20, at 8:30. Following is the program of the convention:

TUESDAY, OCTOBER 21

MORNING

Address of welcome: J. F. Holden, vice-president of the Kansas City Southern.
Address: R. H. Aishton, president, American Railway Association.
President's address.
Report of the secretary-treasurer.
Committee report on Smoke Jacks.

AFTERNOON

Committee report on the Maintenance of Water Stations.
Paper: The Inspection of Bridges; A. F. Robinson, A., T. & S. F.
Committee report on Roofing Materials.

EVENING

Joint meeting with the American Wood Preservers' Association, beginning with an informal dinner.
Paper: The Fire Hazard of Treated Timber, by C. S. Heritage, K. C. S.

WEDNESDAY, OCTOBER 22

MORNING

Committee report on the Economical Methods of Handling Minor Jobs of Maintenance Work.
Address: The Effect of Maintenance on the Design of Railroad Bridges; John Lyle Harrington, consulting engineer, Kansas City.
Paper: The Reconstruction of the Union Pacific's Columbia River Bridge; G. H. Trout, U. P.
Committee report on the Reduction of Accidents to Employees.

AFTERNOON

Committee report on the Placing of Concrete in Winter.
Address: History of the Eads Bridge; Charles E. Smith, consulting engineer, St. Louis, Mo.
Address: The Bridge Work of the Kansas City Terminals; J. V. Hanna, K. C. T.

EVENING

Annual dinner.
Lecture: The Grand Canyon of the Colorado River; Professor R. C. Moore, University of Kansas.

Thursday, October 23; at 9 a. m., Committee report on the Inspection of Painting. At 2 p. m., inspection trip over the Kansas City terminals by special train provided by the Kansas City Terminal Railway.

Revenues and Expenses for August

Operating revenues of Class I railroads representing a total mileage of 236,132 miles totaled $508,394,000 in August, according to reports for the month compiled by the Bureau of Railway Economics from returns filed by the carriers with the Interstate Commerce Commission. This was a decrease of $56,134,600 or 9.9 per cent as compared with the same month last year. Operating expenses totaled $373,599,300, a decrease of $53,853,900 or 12.6 per cent.

The net operating income for August was $95,415,300, as compared with $98,934,000 in August last year or a decrease of $3,518,700. In July, 1924, the net operating income was $74,088,000. The net operating income for the first eight months this year was $561,059,355, which was at the annual rate of return of 4.09 per cent on their property investment, as compared with $630,715,546, or 4.74 per cent, for the same period last year.

Net operating income by districts for the first eight months, with the percentage of return on property investment on an annual basis, was as follows:

		Per cent
New England Region	$21,292,522	3.47
Great Lakes Region	113,304,424	4.82
Central Eastern Region	120,444,339	4.16
Pocahontas Region	30,294,250	5.30
Total Eastern District	285,335,535	4.44
Total Southern District	87,968,972	5.22
Northwestern Region	46,001,355	2.49
Central Western Region	95,612,054	3.73
Southwestern Region	46,141,439	3.85
Total Western District	187,754,848	3.35
UNITED STATES	$61,059,355	4.09

Class I carriers operating at a loss in August totaled 13 of which 6 were in the Eastern, 2 in the Southern and 5 in the

Western districts. In July there were 27 roads which had operating deficits.

For the first eight months this year while freight traffic showed a decrease of approximately 12 per cent as compared with the corresponding period last year and total operating revenues showed a decrease of 8 per cent, operating expenses decreased 8.2 per cent. There was a reduction of $142,109,300 or more than 9 per cent in maintenance expenses. For the month of August alone, maintenance expenses amounted to $174,556,100, a decrease of $33,924,600 or more than 16 per cent as compared with the amount expended for that purpose in August last year. For maintenance of way alone there was a reduction in August of $7,746,249 or 9.6 per cent, while the reduction in expenditures for maintenance of equipment amounted to $26,178,327 or 20.5 per cent.

Out of each dollar of operating revenues received by the railroads in August, 73.49 cents were expended in expenses, as compared with 75.77 cents in August, 1923.

Carriers in the Eastern district had a net operating income in August of $46,500,800, as compared with $51,914,190 in August last year. Freight traffic in the Eastern District in August, according to incomplete returns, was nearly 16 per cent under that of the corresponding period last year. Operating revenues of the Eastern carriers totaled $249,069,400, a decrease of 14 per cent under August the year before. Operating expenses totaled $183,874,260, a decrease of 16.1 per cent. Class I carriers in the Eastern district earned during the first eight months this year $285,335,500 of net operating income, as compared with $343,888,270 during the corresponding period last year.

Class I carriers in the Southern district in August had a net operating income of $10,947,350, as compared with $8,953,000 in August last year. Freight traffic on the Southern roads in August decreased more than 8 per cent. Operating revenues of the Southern carriers in August totaled $61,967,100, a decrease of 5.2 per cent, while operating expenses totaled $47,177,000, a decrease of 10.7 per cent compared with August 1923. The net operating income for the Class I roads in the Southern district for the first eight months this year was $87,968,970, as compared with $86,577,800 during the same period last year.

Carriers in the Western district had a net operating income in August of $37,967,150, as compared with $38,066,800 for the same month last year. Freight traffic in the Western district showed a decrease of approximately 7.5 per cent under August, 1923. Operating revenues of the Western carriers totaled $197,357,770, a decrease of 5.9 per cent, while operating expenses totaled $142,548,000, a decrease of 8.3 per cent. Class I carriers in the Western district during the first eight months this year had a net operating income of $187,754,850 compared with $200,249,450 during the same period one year ago.

Program for International Railway Congress, London, June 22, 1925

The International Railway Congress, which, as has been announced in these columns, will convene in London on June 22, 1925, has made public the program of the meeting. Following precedent, reports to the Congress will be prepared by individuals (designated "reporters") representing the various countries. In the following tabulation of the program, the names given are in every case those of the reporters on the subjects mentioned:

I. Maintenance of Way; Highway Grade Crossings

Note: Under this head will be discussed different methods of track repair and maintenance (including that by the railroad, by contractor, piece work, premium payments, etc); means and methods of highway grade crossing protection will also be discussed, particularly with reference to means of dispensing with crossing watchmen.

Great Britain and Colonies.—W. H. Coomber, Divisional Engineer, Permanent Way, London, Midland & Scottish.

America.—G. J. Ray, Chief Engineer, Delaware, Lackawanna & Western.

France.—R Ruffieux, Chief Engineer of Permanent Way, Paris, Lyons & Mediterranean.

Italy, Spain & Portugal.—D. Mendizibal, Assistant Chief Engineer of Way and Works, Madrid, Saragossa & Alicante (Spain).

Other Countries.—H. Deyl, Counsellor to the Ministry of Railways of Czecho-Slovakia, and Maas Geesteranus, Chief Engineer of Way and Works, Dutch Railways.

II. Rail Joints and Rail Failures

America.—W. C. Cushing, Engineer of Standards, Pennsylvania.

Great Britain and Colonies.—C. J. Brown, Chief Engineer, Great Northern and Great Central Sections of the London & North Eastern.

France.—M. Merklen, Chief Engineer of Way and Structures, Alsace-Lorraine Railways, and M. Cambournac, Chief Engineer of Designs for Permanent Way and Structures, Northern Railway (France).

Other Countries.—J. M. J. Willem, Chief Engineer for the Reception of Track Materials, Belgian State Railways.

III. Yards and Switching

Great Britain and Colonies.—R. H. Nichols, Superintendent of the Line, Great Western.

America.—S. T. Wagner, Chief Engineer, Reading.

France and Belgium.—M. Mouthier, Assistant Chief of Operation, Northern Railway (France), and M. Pellarin, Assistant Chief Engineer of Way and Works, Eastern Railway (France).

Other Countries.—W. Simon Thomas, Chief of the Operating Service Division, Dutch Railways.

IV. Reduction of Motive Power Costs

Note: The reports under this head will deal with fuel problems (coal, mixing of coal with peat, oil fuel, pulverized coal, solid and liquid fuels, etc.), stokers, smoke consumption, spark arresters, lubricants, roller and ball bearings.

America.—G. H. Emerson, Chief of Motive Power and Equipment, Baltimore & Ohio.

Great Britain and Colonies.—C. B. Collett, Chief Mechanical Engineer, Great Western, and Sir Henry Fowler, Deputy Chief Mechanical, London, Midland & Scottish.

Other Countries.—H. P. Chenu, Inspector of the Direction of Rolling Stock and Motive Power, Belgian State Railways and J. Tete, Principal Engineer of Rolling Stock, Paris, Lyons & Mediterranean.

V. Electric Locomotives

America.—J. T. Wallis, Chief of Motive Power, Pennsylvania.

Other Countries.—M. Weiss, Chief Engineer of the General Direction of Motive Power and Shops, Swiss Federal Railways.

VI. Locomotive Terminals

Note: The reports on this subject will cover arrangements for locomotive inspection, boiler washing and flue cleaning, abeyance of the smoke nuisance, firing up, cinder disposal, fuel loading, means of recovering fuel from the residue of combustion.

America.—R. W. Bell, General Superintendent of Motive Power, Illinois Central.

Great Britain and Colonies.—R. E. L. Maunsell, Chief Mechanical Engineer, South Eastern & Charham Section, Southern Railway (England).

Other Countries.—J. Jacometti, Chief Engineer of Motive Power and Rolling Stock, Italian State Railways.

VII. Train Dispatching

America.—F. P. Patenall, Signal Engineer, B. & O.

Great Britain and Colonies.—J. H. Follows, Chief General Superintendent, London, Midland & Scottish.

Other Countries.—E. Epinay, Assistant Chief Operating Engineer, Paris-Orleans.

VIII. Suburban Service

America, Great Britain and Colonies.—E. C. Cox, Chief Operating Superintendent, Southern Railway (England) and A. R. Cooper, Chief Engineer, London Underground Railways.

Other Countries.—M. Direz, assistant Chief of Operation, French State Railways.

IX. Fixed Signals

America,—W. H. Elliott, Signal Engineer, New York Central.

Great Britain and Colonies.—W. J. Thorrowgood, Signal and Telegraph Superintendent, Southern Railway (England).

Italy, Belgium and Holland.—C. de Benedetti, Chief Engineer of the Special Office, Italian State Railways.

Denmark, Norway and Sweden.—T. Hard, Principal Engineer of the Royal Administration, Swedish Railways.

Other Countries.—M. Pinus, Assistant Chief of Operation, Southern Railway (France) and M. Laigle, Assistant Chief Engineer of Way, of the same road.

X. The Eight-Hour Day

America, Great Britain and Colonies.—W. Clower, Assistant to General Manager, London, Midland & Scottish.

Switzerland, Italy, Spain and Portugal.—L. Velani, Chief of Personnel, Italian State Railways.

Other Countries.—M. de Ruffi de Ponteves, Director of Labor to the French Ministry of Public Works.

XI. Statistics

America.—Colonel J. T. Loree, Vice-President and General Manager, Delaware & Hudson.

Other Countries.—A. E. Kirkus, Director of Statistics, Ministry of Transport of Great Britain.

XII. Joint Station and Track

America, Great Britain and Colonies.—R. Cope, Chief Accountant, Great Western (England).

France.—M. Collot, Assistant Chief Engineer of Operation, Eastern Railway (France) and M. Bruneau, Chief Engineer of Operation, Southern Railway (France).

China and Japan.—J. Murai, Director of Commercial Service, Imperial Japanese Government Railways.

Other Countries.—U. Lamalle, Director of Administration, Belgian State Railways.

XIII, XIV and XV. Light Railways

Note: These heads deal respectively with the establishment of light (generally narrow-gage) railways, concessions for them and traction for them (including rail motor traction). There are no reports from North America in this field.

Traffic News

The autumn meeting of the Mid-West Regional Advisory Board will be held in the Hotel LaSalle, Chicago, on October 15. One of the principal subjects to be discussed is the more efficient loading and unloading of freight by shippers.

Officers of the Gulf, Colorado & Santa Fe held a meeting at Galveston, Tex., on September 27 to discuss a program of intensive agricultural development designed to bring out the possibilities of the various agricultural centers in Texas, by applying the principles of specialization and scientific farming. The Santa Fe has followed a policy of lending general encouragement to agriculture along its lines, but under the new policy it will encourage intensive development of production of commodities to which various communities are specially adapted. To carry on its plan the railroad will work in harmony with the Agricultural and Mechanical College of Texas.

The terms and conditions of the warehouse receipts used by the American Warehousemen's Association, which were discussed at a conference at the Department of Commerce, at Washington, on September 24, are to be subjected to further investigation and study during the next few months, with a view to securing general approval of standard conditions, to be used everywhere on a uniform receipt. These terms and conditions already are recognized as standard by the members of the association and the object of this conference is to cultivate interest on the part of bankers, shippers and others with a view to securing universal approval. The need of a standard form of receipt is widely felt.

As an emergency measure to relieve the condition of stockmen in Arizona and New Mexico following the present dry period, the Southern Pacific has applied to the Interstate Commerce Commission for permission to put into effect a 35 per cent reduction in rates on cattle shipments from the drought-affected areas of Arizona and New Mexico. It is proposed to apply the reduced rates to points within the territory bounded by Wellton, Ariz., Nogales and Globe, to California, Oregon, Nevada, Texas, Colorado, Kansas, Oklahoma, Nebraska, Wyoming, Montana and the Dakotas. A reduction in rates is also contemplated on shipments of range cattle from the Arizona and New Mexico territories to Nogales, Ariz., when destined for Mexico.

Northwest Grain Movement Being Handled Without Difficulty

Loading of grain and grain products in the Northwest thus far this season is the greatest on record but is being handled without transportation difficulty, the Car Service Division of the American Railway Association announced on October 2.

The principal roads in the Northwestern district have the largest number of cars on their lines ever reported. They had 108.3 per cent of their box car ownership on their lines on September 15 compared with 101.4 per cent on August 15 or nearly 15,000 more box cars than they own.

This remarkable car supply has been accumulated by the railroads voluntarily and without special orders from the Car Service Division either to these roads or to the Eastern Lines. This record is convincing proof of the determination of the Northwestern lines to furnish adequate transportation and also the effective co-operation accorded by roads in other territories to the same end. It is reasonable also to add that it is a further indication of the benefits from present car distribution methods.

"Undoubtedly, every car so placed in the Northwest will be needed for loading. To date there have been no cases of actual car shortage.

"Total commodity loading on all railroads of the country for the week ending September 20 was 1,076,553 cars, exceeding the corresponding week last year by 15,742 cars. Grain and grain products loading totaled 68,563 cars. Grain loading for all of the past four weeks has exceeded the highest previous record of this commodity loading which was established in the week ending July 21, 1921, viz.: 64,715. In 1923 the highest week's loading was 54,937.

"Thus it will be seen that grain traffic this year is being offered in unprecedented volume and is being handled without any difficulty from a transportation standpoint. In addition to the current movement in the Northwest there is still a heavy tide from country stations of the winter wheat territory to terminal markets and from terminal markets to mills and ports. Storage facilities at certain terminal markets are already practically full and it appears that this is likely to prove the only limiting factor in the grain movement this year.

"The Terminal Grain Committee, established by the Northwest Board at Minneapolis, is functioning actively and fearlessly to the benefit of the entire trade and is greatly contributing to transportation service."

Pullman Rate Hearing

The hearing before Commissioner Campbell and Examiner Keeler of the Interstate Commerce Commission at Washington in the investigation of Pullman rates and the surcharge was brought to a close on October 4 with the understanding that it may be reopened about the latter part of October. The last evidence relating to the surcharge part of the case was put in on October 2 and briefs are to be filed in 30 days. There will be no further tentative report as to the surcharge but a tentative report will be issued as to the Pullman rates which the commercial travelers' organizations have asked to have reduced. Briefs in the Pullman rate part of the case are to be filed within 60 days from the close of the hearing and the two parts of the case will probably be argued together.

The testimony at this hearing relating to Pullman rates was confined to questions of accounting involving the property investment account and the net operating income of the Pullman Company. Following the testimony of the commission's accounting and engineering witnesses who have made an analysis of the accounts, L. S. Taylor, vice-president and comptroller of the Pullman Company gave a restatement of the accounts, as adjusted in accordance with the recommendations of the examiners in so far as these are admitted by the company, with an explanation of the points of disagreement. Additional witnesses went into details regarding the valuation of the company's property as a check against the property account. The total for the operating department as of December 31, 1923, according to Mr. Taylor, was $171,198,815, or approximately $20,000,000 greater than the amount shown by the examiners, much of the difference being accounted for by differences in the accounting for major renewals as between capital and maintenance. Mr. Taylor said that entries had been made on the books since August 1, 1922, in accordance with the major renewals rule after an understanding with Director Wylie of the Bureau of Accounts. There was also a difference as to the retroactive retirement of cars. In 1921 the company retired a large number of cars which would have been retired earlier except for the need for them during the war; but because of the war experience it was felt unwise to retire them too fast until new ones were built, and there was a heavy demand for cars in 1920. Then in 1923 a large number were authorized to be retired and on direction of Mr. Wylie they were retroactively written out as of the date of their last revenue service. Mr. Taylor said that there would be no difference between the company and the bureau on this point except that the company felt that as long as the cars were being kept as a reserve for the benefit of the public they should be included in the property account when it is used as a rate base. It is impossible, he said, to forecast long in advance the demand for cars. Mr. Taylor also showed that the company's average profit on passenger cars built for others was 11.39 per cent, whereas its manufacturing department charged only 10 per cent profit on Pullman cars and he said that the cost of the Pullman cars was lower than it would otherwise be because of the fact that the plant is also used for manufacturing cars for others.

A good deal of the time of the hearing was taken up in cross-examination and rebuttal testimony to show what the Pullman Company considered the unpractical nature of some of the formulas used by the commission's engineers and examiners in making their adjustments. J. W. Roberts, president of the Roberts-Pettijohn-Wood Corporation, said that in addition to the physical assets the Pullman Company has non-physical values amounting to several millions of dollars, and he also declared that its business is so largely unique that its situation is in many respects not analogous to that of a steam railroad, so that accounting classifications applicable to the railroads do not in all cases fit its situation.

Commission and Court News

State Commissions

Railroad Required to Provide Omnibuses

On a showing before Commissioner Van Voorhis that the New York Central did not receive passenger revenue sufficient to meet the actual cost of running the trains, the New York State Public Service Commission has dismissed a complaint against the proposed abandonment of certain passenger trains on the Dresden-Penn Yan branch. Allowing the train service to be discontinued is conditioned, however, upon the railroad making the necessary arrangements for a proper motor bus service for communities on the branch line. It is understood the trains will be discontinued on September 28.

Court News

Process Cannot Be Served on Traveling Passenger Agent

The Kentucky Court of Appeals holds that service of process cannot be made on the traveling passenger agent of a foreign railroad company having no line in the state. Basham's Adm. v. Mo. Pac. (Ky.) 258 S. W. 690.

Missouri Commission's Permission Not Required Before Withdrawal of Passenger Trains

The Missouri Supreme Court holds that the state Public Service Commission has no authority to require railroads to obtain the commission's permission before discontinuing the operation of any passenger train.—P. S. C. v. St. Louis-S. F. (Mo.) 256 S. W. 226.

Public Service Commission Without Jurisdiction of Claim for Excessive Freight Charge

The Missouri Supreme Court holds that under the state Constitution the legislature cannot vest the Public Service Commission with jurisdiction of judicial questions such as a shipper's claim for reparation for an excessive freight charge.—State ex rel. Mo. Pac. v. P. S. C. (Mo.) 259 S. W. 445.

Statutory Fence Must Be Sufficient to Turn Stock of Ordinary Disposition

The Texas Court of Civil Appeals holds that the statute which requires railroad companies to fence their tracks in order to escape absolute liability means that the fence constructed must be sufficient to turn stock of ordinary habits and disposition.—Fort Worth & D. C. v. Harris (Tex.) 256 S. W. 699.

Delay Followed by Act of God

A shipment of cattle from Panhandle to Fort Worth was delayed at Amarillo for about 22 hours, and again at Clarendon by an unprecedented rainfall. The Texas Court of Civil Appeals holds that the negligent delay at Amarillo, concurring with the rainfall at Clarendon, was not an act of negligence which would render the carrier liable for damages for delay.—Fort Worth & D. C. v. Lemons (Tex. Civ. App.) 258 S. W. 1095.

Driver Not Intending to Use Crossing Not Entitled to Rely on Signals

The Kentucky Court of Appeals holds that the Kentucky statute (§786) requiring signals by trainmen approaching crossing does not protect drivers using a road near the crossing but not intending to cross, and the driver of a mule injured when the mule was frightened by the approach of a train, was not entitled to rely on warning crossing signals being given.—L. & N. v. Richmond (Ky.) 259 S. W. 329.

Fireman's Duty as to Look-Out

The Kentucky Court of Appeals holds that the rule that where the engineer's view is obstructed the lookout duty devolves upon the fireman is not confined to cities and thickly settled communities; that the controlling feature is not necessarily the place, but whether or not a lookout duty is required. If required, it must be effective, and, if not effective by the engineer alone, the duty then devolves upon the fireman.—C. & O. v. Bradford (Ky.) 258 S. W. 939.

Experience of Other Automobilists Incompetent Evidence

The Missouri Court of Appeals holds that, in a crossing accident case, evidence of the individual experience of others, in different automobiles and of different makes, is not competent as to the condition of the crossing and the approach, on account of the difference in the cars and the skill of drivers.—W. Kerall v. St. Louis-San Francisco (Mo. App.) 257 S. W. 166.

Railroad Held Not Liable for Express Company Handling Its Express Business

The Arkansas Supreme Court holds that a railroad was not liable for the failure of an express company owning its own cars which handled all the railroad's express business, both companies having the same agent, for the express company's failure to furnish a refrigerator car, the agent testifying that in accepting the order, he acted solely for the express company.—St. Louis-San Francisco v. Fruitman's Union (Ark.) 258 S. W. 626.

Delivery Without Surrender of Order—Notify B. L.

The Texas Court of Civil Appeals holds that a provision in a bill of lading fixing damages for loss or injury to the goods at the time and place of shipment is void as limiting or avoiding the railroad's liability as a carrier and as against public policy and cannot be enforced by either party. The action was for conversion of cotton shipped on an order bill of lading and delivered without surrender of the bill of lading to a compress company, in whose possession the cotton was destroyed by fire.—Gulf, C. & S. F. v. Buckholts State Bank (Tex. Civ. App.) 258 S. W. 491.

Initial Carrier's Duty as to Diversion of Shipment

After a shipment from Bryan, Texas, to Chicago had reached destination and been refused by the purchaser, the shipper requested the local agent of the initial carrier to divert the shipment to New York. In an action against the initial carrier for damages for delay in delivery at New York, the Texas Court of Civil Appeals holds that, in the absence of a special contract, the initial carrier is not required, after the shipment has left its road, to notify its connecting carriers that the owner or consignee of goods desires them diverted; and the carrier was not liable.—Houston & T. C. (Tex. Civ. App.) 258 S. W. 542.

Contributory Negligence of Guest in Automobile

The undisputed evidence that the operator of a railroad motor car saw an automobile approaching the point of collision for a half mile, the Texas Court of Civil Appeals holds, did not support the finding of the jury that he failed to use proper care to observe the approach of the automobile, and that such failure was the proximate cause of injury to a guest in the automobile. If the jury had found that the guest failed to look or listen or take any precaution to prevent the collision, and that such failure was negligence on his part and the proximate cause of the collision, judgment should have been rendered for the defendant.—Texas City Terminal Co. v. Showalter (Tex. Civ. App.) 257 S. W. 621.

Squeaking Air-Pump Not Defective

In an action under the Federal Boiler Inspection Act for the death of an engineer, the New York Appellate Division holds that the burden was on the plaintiff to prove that the appurtenances of the locomotive were in proper condition and safe to operate in the service to which it is put, and also the railroad's failure to keep them in such condition. The fact that the air

pump squeaked and groaned was not a defect, but a condition requiring lubrication by the engineer. The statute does not require a perfect, but only a proper condition, and a different standard might govern a yard engine and one put to another service.—Luce v. N. Y. C. & St. L., 205 N. Y. Supp. 273.

Shipper's Duty to Have Cattle Certified by Federal Inspector

After a shipper on October 26, had ordered a car for cattle, the county was made a quarantine district, preventing the shipment of cattle out of the county after October 31. The Arkansas Supreme Court holds that it was the shipper's duty to have his cattle inspected and certified by the federal inspector before tendering them to the railroad in time to have them shipped before the quarantine order took effect, and on his failure to do so the railroad was not liable for failure to furnish a car within six days after notification under the Arkansas statute (Crawford & Moses' Dig. §895). —Ft. Smith, Sublaco & Rock Island (Ark.) 258 S. W. 374.

Prior Delay in Transportation as Cause of Fire

The Kentucky Court of Appeals finds that while the principle that a carrier will be liable for fire resulting from its prior negligent delay in shipping goods, has been adopted in Kentucky and other state courts, prior delay in transportation is regarded by the federal courts as being only a remote cause of injury and not as contributing thereto, at least unless the carrier has such notice of the situation as to cause it to apprehend the danger; and when an injury is shown to have been caused by a vis major or other exempting cause, as fires or riots, it is the duty of the shipper suing for damages to show negligence independent thereof. The court followed the rules adopted by the federal courts in these matters in an action for damage to an interstate shipment by fire caused by a race riot.—Julius Kessler & Co. v. Southern (Ky.) 255 S. W. 535.

Decisions Under Federal Employers' Liability Act

The New York Appellate Division holds that an employee, engaged in repairing an engine used wholly within the state both for interstate and intrastate traffic, withdrawn from service and in the roundhouse repair shop for five days, the repairs consisting in repairing worn tires, was not engaged in interstate commerce. —Conklin v. N. Y. C., 206 App. Div. 524, 202 N. Y. Supp. 75.

The Missouri Court of Appeals holds that an employee of an interstate railroad company, employed in painting block signals, thrown from a motorcar furnished by the railroad for transporting him to and from his work, while in the railroad's service and while going from one place of work to another was engaged in interstate commerce.—Brewer v. M. P. (Mo. App.) 259 S. W. 825.

The Kentucky Court of Appeals holds that, where there were no more cars to be moved by a switch engine that day, and the only business it had on the track when an accident happened, killing its engineer, was to accommodate the helpers in transferring the retracker from one end of the yards to another, the engine was not engaged in interstate commerce.—Meyer's Adm. v. C. & O. (Ky.) 259 S. W. 1027.

The Circuit Court of Appeals holds that a machinist and his helper, engaged in making, in a roundhouse, the usual running repairs on an engine engaged in interstate commerce, on the layover period between trips, the engine not being withdrawn from interstate commerce for the purpose of making the repairs, were engaged in interstate commerce.

Although the helper, when injured, had discontinued his work and was bound for lunch, he was still engaged in interstate commerce within the act.—B. & O. v. Kast, 299 Fed. 419.

PASSENGERS TRAVELING to or from Florida over the Atlantic Coast Line are informed by that company, in advertisements circulated in Florida and elsewhere, that 80 per cent of the line between Washington, D. C., and Jacksonville, Fla., is double track, and that all of this double track is equipped with automatic block signals. Nearly all of the railroad crossings have interlocking signals. The Atlantic Coast Line plans to have all of this main line to Jacksonville made double track by the end of 1926.

Foreign Railway News

Austria Gets Equipment Order from Turkey

It is reported by the Wall Street Journal, New York, that the Turkish government has given an order for miscellaneous railway equipment of the value of approximately $1,200,000 to the Aktiengesellschaft fuer Eisenbahnbedarf, Vienna, Austria.

Cut-Off in Ecuador Saves a Day's Journey

A short cut-off (12 miles in length) on the Guayaquil & Quito in Ecuador, according to Commerce Reports, has placed the town of Riobama on the main line, instead of a branch, and travelers between Guayaquil and Quito can now make the journey in one day, instead of two and the enforced remaining over night at Riobama has been eliminated.

Powers Concerned Over Chinese-Soviet Pact

The various European governments, particularly France, as well as that of the United States, are much concerned over the agreement between Chang Tso-lin, the war lord of Manchuria, and the Soviet government, giving the latter charge of the Chinese Eastern Railway, thereby endangering China's interest in the property and placing in jeopardy American and European investments therein.

French Road Has Secured American Loan for Electrification

The Paris, Lyons & Mediterranean, the largest road in France, has secured a loan of $20,000,000 to carry on its electrification program. A loan of $10,000,000 for the Paris-Orleans, another French road, was recently floated in the New York market for the same purpose. Electrification work is being concentrated on lines of heavy grades and heavy traffic but, owing to the high price of coal, will be extended generally.

Rumored That Argentine Government Desires to Purchase Cordoba Central

It is rumored, says Modern Transport (London), that the Argentine Government Railways are desirous of purchasing the British-owned Cordoba Central Railway. The government-owned lines in the northern part of the country now terminate at Cordoba and Santa Fe and the acquisition of this British line would give them direct access to Buenos Aires. The line, too, is of the same gage as the government lines, viz. one meter. The line would also give the government a connection between Rosario and Buenos Aires. The Cordoba Central has not been as prosperous in recent years as some of the other British-owned roads in Argentina.

High Capacity Coal Cars in England

In these columns of the September 20 issue a brief item was published regarding the use of higher capacity coal cars (20 long tons) on the Great Western (England). The *Railway Age* is informed by George Davidson, divisional general manager of the North Eastern Area of the London & North Eastern that in his area, formerly the North Eastern Railway, cars of 40 tons' capacity were introduced as far back as 1902 and that at the end of 1922 when the North Eastern was merged into the London & North Eastern it had over 20,000 coal cars of a capacity of 20 long tons or more. Consequently the average load per coal car in the North Eastern Area is larger than that obtained in any other part of Great Britain.

Norwegian Railway Finances Improved

The gross income of all Norwegian railroads for the year ended June 30, 1923, according to Commerce Reports, amounted to 111,600,000 crowns, of which 52,500,000 crowns was received from passenger traffic and 57,000,000 crowns from freight traffic. Although total earnings were 700,000 crowns less than for the pre-

ceding year, operating and maintenance expenses also were less by 22,300,000 crowns. Net profits approximate 4,000,000 crowns, contrasting with a loss of 3,400,000 crowns the year before. Of these totals the state railroads accounted for a gross income of 93,400,000 crowns for the year ended June 30, 1923, compared with 104,300,000 crowns for the preceding year, and for net profits of 1,740,000 crowns in contrast with a loss of 4,400,000 crowns in the earlier year.

Swiss Freight Rates to Be Reduced

General freight rates on Swiss railways will be reduced for long distances on or before January 1, 1925, according to a decision of the Administrative Council, according to Commerce Reports. The reductions will favor the cantons in each extremity of the Confederation and will decrease receipts by about 2,000,000 francs. The canton of Geneva, which asked lower rates on incoming food products, and of Tessin, which asked for the abolishment of special mountain rates said to be burdensome to agriculturists, will be partially satisfied. The reductions will be as follows: For distances of 151 to 200 kilometers, the pre-war rates will be increased by 50 per cent instead of 105 per cent, as at present; for distances from 201 to 300 kilometers, the rate will be a decrease of 20 per cent from the pre-war rate, instead of the present increase of 20 per cent; for distances of 301 kilometers and more, the rate will be a 50 per cent decrease from pre-war rate, instead of the present increase of 10 per cent.

Great Western Lecture and Debating Society Announces Program

The Great Western (England) Lecture and Debating Society, an organization of officers and employees of the railway at London, the main purpose of which is educational, has announced its program for the season 1924-1925 as follows:

October	9—Notes on a Visit to Sudan (Illustrated).
October	23—Seaport Equipment.
November	6—Important Aspects of Railway Traffic Operation.
November	20—Flying for Business and Pleasure (Illustrated).
December	4—The Railways Act of 1921—Is It a Failure?
January	8—Passenger Train Operation in Relation to Road Motor Competition.
January	22—"Gold Medal" Essay Paper.
February	5—Advertising with Special Reference to Railway Publicity (Illustrated).
February	19—Prevention of Railway Accidents (Illustrated).
March	5—Can Psychology Help in Railway Work?
March	19—Annual Meeting, Presentation of Prize Essay Competition Awards and Presentation of "Silver Medal" Essay Paper.

The proceedings of all the meetings are printed and distributed among the members. Membership dues are very low—only one shilling a year.

Details of Ontaneda-Calatayud Railway Project

Further details regarding the contract for and the construction of the proposed Ontaneda-Calatayud railway in Spain are now available. The line is to be 250 miles in length and is estimated to cost over £10,000,000 (normally $50,000,000).

This railroad has been open to tender for many years without any Spanish offer being attracted, despite the state guarantee of 5 per cent interest. Recently, at the request of a group of English capitalists (Bernhard Scholle & Co., and Central Mining & Investment Corporation), an adjudication date was fixed, and on September 10 the one and only tender prepared was presented by Señor Willy Solms, a naturalized Spanish citizen, in the name of the four county councils of Burgos, Soria, Santander and Saragossa. It was accepted. Sr. Solms is now proceeding to form the Spanish company proper that will construct and possibly operate the line. This Spanish company will be connected with a British construction company.

In the building of the railroad the law for the protection of Spanish industries will have to be observed. This law provides that Spanish concerns only shall be requested to tender for material. But should no Spanish concern be able to fulfill the conditions of the tender, then foreign concerns may be permitted to make offers. The offer of any Spanish concern, however, that comes within 10 per cent of the lowest foreign tender must be given preference. In other words, there must always be a margin of 10 per cent in favor of Spanish concerns. The margin is really considerably greater than 10 per cent, as it is necessary for foreign concerns to pay insurance, freight, and the high Spanish customs duties. The following statement made by Señor Solms to a Madrid newspaper seems to point to the fact that not many orders for material will go to Great Britain or any other country, as was at first anticipated:

"I have given my word of honor to His Majesty the King that all the materials used for the construction of this railway shall be Spanish. Only such materials as it is absolutely impossible to obtain in Spain will be purchased in England."

Britain Secures Spanish Railway Contract

The fact that the contract for the construction of the strategic railway to be built from Santander to Calatayud, via Burgos and Soria, has been awarded to an English syndicate is regarded as of considerable importance in Great Britain. Brief general details of this line, which is to be known as the Ontaneda-Calatayud Railway have already appeared in the *Railway Age*.

The accepted tender is that of a group representing British capital, on whose behalf Sir Lionel Phillips has personally been conducting negotiations. The new line will provide direct through communication between Santander and Valencia, i. e., between Atlantic and Mediterranean ports, and is expected to lead to the development of districts of considerable potential industrial value.

The concession granted provides for a guarantee by the Spanish government of interest at the rate of 5 per cent on a capital of approximately 348,000,000 pesetas for a period of ninety-nine years. It is understood that an English company will be formed under the ægis of the Central Mining & Investment Corporation and Bernhard Scholle & Co., both of London, to carry out the construction of the line.

Apart from the opening afforded by the concession for the profitable employment of British capital, it is hoped in London financial circles that British trade may successfully compete for a fair share of all equipment which Spain may be unable or in a less favorable position to supply.

THE MISSOURI PACIFIC loaded 103,399 carloads of freight on its lines and received 41,014 from connections during September, making a total of 144,413 cars, the largest number ever handled by the railroad in any one month. The average miles per car per day for September was 37.8 as compared with 35.2 during August and 32.6 during September of last year. Wheat loaded on the Missouri Pacific in September totalled 6,143 cars as compared with 2,843 during September last year.

The Prince of Wales and (at His Right) A. E. Warren, General Manager, Western Region, C. N. R., on Station Platform, Winnipeg

Equipment and Supplies

Locomotives

THE HAVANA CENTRAL, reported in the *Railway Age* of September 13 as inquiring for 10 locomotive tenders, has ordered this equipment from the Baldwin Locomotive Works. The tenders will have a capacity of 3,500 gal.

THE SOUTHERN RAILWAY, reported in the *Railway Age* of September 20 as inquiring for 25 Mikado type locomotives, 15 Pacific type locomotives and 10 eight-wheel switching type locomotives, has ordered this equipment from the American Locomotive Company. The Mikado type locomotives will have 27-in. by 32-in. cylinders and a total weight in working order of 326,000 lb.; the Pacific type will have 27-in. by 28-in. cylinders and a total weight in working order of 299,000 lb., and the switching type will have 25-in. by 28-in. cylinders and a total weight in working order of 214,000 lb. The Mikado and Pacific type locomotives will be equipped with Elvin stokers.

Freight Cars

THE GREAT NORTHERN is inquiring for 40 air dump cars.

THE GREAT NORTHERN is inquiring for 38 refrigerator car underframes.

THE INTERSTATE COOPERAGE COMPANY, New York, is inquiring for four logging cars.

THE NORTHERN PACIFIC is expected to enter the market soon for a number of freight cars.

THE NATIONAL TUBE COMPANY, Pittsburgh, Pa., is inquiring for 10 freight cars of 70 tons capacity.

THE BUFFALO & SUSQUEHANNA is inquiring for bids on 400 all-steel, hopper-bottom coal cars of 55 tons' capacity.

THE CENTRAL OF NEW JERSEY is inquiring for 50 box cars, one to be of 50 tons' capacity and the remainder of 40 tons'.

THE WHEELING & LAKE ERIE has ordered 1,000 steel box cars of 50 tons' capacity from the Standard Steel Car Company.

THE MOBILE & OHIO is inquiring for 200 double-drop-bottom, steel-frame gondola cars of 50 tons' capacity and 150 steel-frame hopper cars of 50 tons' capacity.

THE QUAKER CITY TANK LINE, INC., St. Louis, Mo., has ordered 3 three-compartment tank cars of 6,050 gal. capacity and 5 two-compartment tank cars of 6,050 gal. capacity from the Standard Tank Car Company.

Passenger Cars

THE LEHIGH VALLEY has ordered 5 all-steel coaches and 3 all-steel dining cars from the Pullman Car & Manufacturing Corporation.

THE GULF COAST LINES, reported in the *Railway Age* of August 30 as inquiring for 2 dining cars, has ordered this equipment from the American Car & Foundry Co.

THE READING has ordered 10 baggage cars from the American Car & Foundry Co., and 10 combination baggage and passenger cars from the Standard Steel Car Company.

THE SOUTHERN, reported in the *Railway Age* of September 20 as inquiring for 25 steel passenger coaches, 10 combination baggage and express cars and 3 dining cars, has ordered this equipment from the Pullman Car & Manufacturing Corporation.

THE MISSOURI PACIFIC, reported in the *Railway Age* of September 6 as inquiring for 2 dining cars and 2 parlor cars, has ordered the dining cars from the American Car & Foundry Co., and the parlor cars from the Pullman Car & Manufacturing Corporation.

Signaling

THE CHESAPEAKE & OHIO has ordered from the Hall Switch & Signal Company four semaphore signals style "L," top-post mechanism.

THE GRAND TRUNK has ordered from the Hall Switch & Signal Company, Garwood, N. J., for installation at Valparaiso, Ind., three top-post motor semaphore signals.

THE CANADIAN NATIONAL has ordered from the Hall Switch & Signal Company, eight semaphore signals, 25 relays and other material to be installed at Winnipeg, Man.

THE NEW YORK, CHICAGO & ST. LOUIS has ordered from the Union Switch & Signal Company, an interlocking machine to be installed at Mortimer, Ohio, at the crossing of the New York Central (Ohio Central Lines). The machine will have 22 mechanical and 12 electric levers. The signals are to be style "R," colored light, for high signals and position light for dwarf signals.

THE NEW YORK CENTRAL has ordered from the Hall Switch & Signal Company, Garwood, N. J., 13 three-color light signals, a part of which, together with a large number of Hall relays and other apparatus, will be used in connection with the installation of automatic train control at Voorheesville, N. Y.; also, 817 relays, 400 switch boxes and other apparatus for use at Toledo and Elyria, Ohio, and Elkhart, Ind.; also, 178 relays and other apparatus for Buffalo, N. Y.

LOCOMOTIVES ORDERED, INSTALLED AND RETIRED

Month	Domestic orders reported during month	Installed during month	Aggregate tractive effort	Retired during month	Aggregate tractive effort	Owned at end of month	Aggregate tractive effort	On order first of following month	Building in R. R. shops
September	8	384	22,342,517	260	7,191,302	64,720	2,506,469,051	1,242	7
October	50	408	21,665,487	301	7,935,709	64,827	2,520,200,846	942	15
November	49	333	19,064,713	282	7,741,395	64,879	2,532,085,380	739	14
December	12	333	18,260,423	316	8,738,378	64,896	2,541,607,425	510	14
Full year, 1923	1,984*	4,037*	.....	3,672	.....	.....	.....	.....	..
1924									
January	125	271	15,228,895	178	4,447,721	64,989	2,552,694,953	439	14
February	85	214	11,296,088	175	4,906,435	65,029	2,559,519,253	457	10
March	283	176	10,457,064	181	6,033,173	64,911	2,560,076,766	520	7
April	100	97	4,167,388	112	2,881,385	64,896	2,561,362,769	552	11
May	107	153	6,949,353	107	2,600,445	64,942	2,565,706,413	447	10
June	1	160	7,687,383	178	4,575,358	64,924	2,569,121,875	360	72
July	83	197	10,590,558	113	3,354,456	65,008	2,576,433,377	401	63
August	8	229	12,513,395	166	5,346,176	65,062	2,583,372,980	324	50
September	101	....	.....	....	.....	.....	.....	....	..
Total for 8 months	....	1,497	.....	....	.....	.....	.....	....	..
Total for 9 months	893	....	.....	....	.....	.....	.....	....	..

Details as to orders from *Railway Age* weekly reports. Figures include all domestic orders placed with builders and railroad shops, but not rebuilt equipment.

Figures as to installations and retirements prepared by Car Service Division, A. R. A., published in Form C. S. 56A-1. Figures cover only those roads reporting to the Car Service Division. They include equipment received from builders and railroad shops. Figures of installations and retirements alike include also equipment rebuilt to an extent sufficiently so that under the accounting rules it must be retired and entered in the equipment statement as new equipment. Figure as to orders as given in first column of table is not therefore comparable with figures relating to installations given in succeeding columns.

*Corrected figure.

Supply Trade News

The Fairfax Iron & Steel Company has been incorporated at Kansas City to manufacture frogs, switches and other railway track material.

The Mt. Vernon Car Manufacturing Company, Mt. Vernon, Ill., will construct a one-story brick and steel foundry, to cost approximately $300,000.

Major J. L. Hays has joined the railway department of the **Edison Storage Battery Company,** with office at 1419 G St., N. W., Washington, D. C. Major Hays was a graduate in electrical engineering of Lehigh University in 1909. After completing his school training he joined the electrical department of the Baltimore & Ohio. He worked there successfully as a mechanic, draftsman, instructor, general foreman and assistant engineer. He was later appointed electrical engineer of the Seaboard Air Line and served in this capacity until he was commissioned as major in the Quartermaster's Corps, at the beginning of the war, in charge of the electrical section of the engineering branch, being responsible for electrical construction for the army in the United States. At the conclusion of the war he joined the Stone-Franklin Company as electrical engineer. The car lighting interests of the Stone-Franklin Company were absorbed by the Safety Car Heating & Lighting Company on January 1, 1923. Major Hays joined the field organization of the Safety Car Heating & Lighting Company and served that company in the capacity of sales engineer up to the time of his making his present affiliation with the Edison Storage Battery Company.

Major J. L. Hays

The Globe Railway Equipment Company has been organized in St. Louis, Mo., to manufacture railway specialties among which as a car door hanger.

J. M. Robb, 929 Monadnock building, Chicago, has been appointed representative in that territory of the **Economy Railway Appliance Company, Ltd.,** Montreal.

The General American Tank Car Corporation plans the construction of a plant on a tract of 230 acres at Good Hope station on the Yazoo & Mississippi Valley near New Orleans, La.

Walter C. Doering, representative at St. Louis, Mo., of the **Bradford Corporation,** New York, has been appointed vice-president in charge of the St. Louis office and of its business in the southwest territory.

The Camel Company, Chicago, has purchased 30 acres of land in Hammond, Ind., on which it will construct a plant. A contract for the construction of a steel and brick building 190 by 320 ft., has been let to the Austin Company, Cleveland, O.

Williams & Wilson, Ltd., 84 Inspector street, Montreal, Canada, is now the representative in the eastern portion of the province of Ontario, and the provinces of Quebec, New Brunswick, Nova Scotia and Prince Edward Island of the **Hanna Engineering Works,** Chicago.

The White Manufacturing Company, Goshen, Ind., manufacturers of case hardened brake pins and bushings for railway trucks and other railway car parts, has moved into its new factory at Elkhart, Ind. **The Chausse Oil Burner Company,** Goshen, Ind., manufacturers of kerosene torches and railway switch heaters, has also moved into the new factory at Elkhart, Ind.

A. H. Weston, sales engineer of the T. H. Symington Company, with headquarters at New York, has been elected vice-president in charge of sales of the **Car Devices Company,** with headquarters at Richmond, Va. Mr. Weston obtained his early mechanical training in the motive power department of the Baltimore & Ohio and the Western Maryland and was for several years mechanical engineer for the Atlantic Coast Line. He left railroad service to enter the employ of the T. H. Symington Company as mechanical engineer and for the past ten years has been sales engineer for the same company, with headquarters at New York.

The Cyclone Fence Company, Waukegan, Ill., has been purchased by the **United States Steel Corporation.** The transfer of the properties includes factories at Waukegan, Ill., and Cleveland, Ohio, and plants at Ft. Worth, Tex., and Newark, N. J. The business will continue under the name of the Cyclone Fence Company and with its present organization with the exception of the principal officers as a subsidiary of the corporation. The Cyclone Fence Company began operation in 1903 in Waukegan, Ill., with a capitalization of $25,000. In 1906 the capitalization was increased to $100,000 and in 1914 to $750,000, while in 1915 it was increased to $1,000,000 and later in the same year to $1,500,000. During 1915 the Cleveland Cyclone Fence Company of Cleveland, Ohio, was purchased and in 1919 the Texas Anchor Fence Company, Ft. Worth, Tex. In 1922 the company purchased a site in Newark, N. J., where it erected a manufacturing building. In 1914 the Chain Link Property Protection fence was added to its line. The company first manufactured ornamental wire fences, ornamental and farm gates and a line of field fences. The latter was discontinued in 1906 and efforts were concentrated on the ornamental fence and gate line. During the last couple of years the company has developed the catch-all basket fence and machinery for its manufacture as well as a chain link wire fabric, galvanized and zinc coated fence.

E. R. Chinberg, electrical supervisor of the Chicago, Rock Island & Pacific, has resigned to take the management of the **West Gate Welding & Electric Supply Company,** of San Francisco, California, a newly organized company dealing in electric welding apparatus and supplies. Mr. Chinberg has the California distribution of the complete line of U. S. L. electric arc welders manufactured by the **U. S. Light & Heat Corporation,** Niagara Falls; the Western distribution of the Wanamaker coated electrodes, manufactured by the **International Welding Engineering Corporation,** Chicago, Ill., and the Tecor welding accessories manufactured by the **Transportation Engineering Corportation** of New York City. Mr. Chinberg began his electrical and welding career in 1907 when he entered the employ of the Goodland Light & Power Company, Goodland, Kansas. He began his services with the Chicago, Rock Island & Pacific in 1910 and through successive promotions was appointed electrical supervisor in 1917. He was associated with Mr. Wanamaker, electrical engineer, in the electrical and electric welding development on that railroad until last April, when he resigned to take over his new duties. The office of

E. R. Chinberg

the newly organized company is at 18 Front street, San Francisco, Calif.

Obituary

George W. Lyndon, president of the Association of Manufacturers of Chilled Car Wheels, died on October 7, in Chicago.

Benjamin Franklin Bourne, chairman of the board of the Bourne-Fuller Company, Cleveland, Ohio, died on September 27 in Cleveland.

Horace W. White, Jr., who was appointed manager of southern sales in January of this year of the T. H. Symington Company, with headquarters at Baltimore, Md., died suddenly in that city on October 4. He was born in Baltimore on May 7, 1888, and was graduated from Franklin High School, Reisterstown, Md. Mr. White entered the employ of the Keystone Coal & Coke Company in 1904, and was later employed by the Mercantile Trust & Deposit Company, Baltimore. In February, 1916, he entered the service of the T. H. Symington Company at Rochester, N. Y., and was granted leave of absence during the World War. He first served in the artillery and was transferred to the air service in which he attained the rank of captain in command of the 182nd Aero Squad, with which he saw service in France. In January of this year he was appointed manager of southern sales of the T. H. Symington Company, to succeed T. C. de Rosset, deceased.

H. W. White, Jr.

Trade Publications

LOCOMOTIVE GRATES.—The construction, the shaking action and the economies derived from the adoption as standard equipment of the Hulson locomotive grate are fully described in a 19-page, illustrated booklet just issued by the Hulson Grate Company, Inc., Keokuk, Iowa. First the shaking action of the Hulson grate is described and illustrated by means of line drawings. On pages eight and nine will be found a description and illustrations of the pocket openings. The middle folio of the book contains a reprint of a blue print showing a typical general arrangement for a Mikado type locomotive. This is followed by a description and photographs of the various parts that make up the grate. On the last page will be found a summation of ten advantages of the Hulson grate.

THE ERIE, in co-operation with Purdue University, La Fayette, Ind., and various breeding associations is arranging to conduct a pure bred bull campaign by means of a special demonstration train to be operated in northern Indiana. The train will carry exhibits on dairying as well as a number of registered dairy bulls which will be sold to dairymen at a low cost.

THE AMERICAN ASSOCIATION OF FREIGHT TRAFFIC OFFICERS held its annual meeting on September 23, at Louisville, Ky. The chief speaker at the banquet in the evening was Judge McKenzie Moss, assistant secretary of the Treasury, who outlined the problems that confront federal officers in their administration of the customs service, with particular attention to smugglers and smuggling. All officers and directors of the association were re-elected at this meeting.

Railway Construction

BALTIMORE & OHIO.—This company has awarded two contracts for work on the Staten Island Rapid Transit, a subsidiary which will be electrified, to the Geo. W. Rogers Contracting Corporation: Eliminating all grade crossings between Prince's Bay and Pleasant Plains, Staten Island, $305,000; extension of an industrial spur at Tottenville, Staten Island, $35,000.

CANADIAN NATIONAL.—This company has awarded a contract to A. B. Palmer, Vancouver, B. C., for the grading of a 10-mile extension of its line on Vancouver island.

CHICAGO, INDIANAPOLIS & LOUISVILLE.—This company is calling for new bids for the construction of a passenger station at San Pierre, Ind.

CHICAGO, ROCK ISLAND & PACIFIC.—This company is calling for bids for the construction of a small passenger station at Peck, Kan.

ILLINOIS CENTRAL.—This company has returned the bids received for the construction of a steel coaling station at Pinckneyville, Ill., reported in the *Railway Age* of October 4, and does not contemplate calling for new bids in the near future.

NEW YORK CENTRAL.—This company has awarded a contract to the H. P. Cummings Construction Company for the construction of an upholstery shop at West Albany, N. Y., to cost approximately $93,400.

PENNSYLVANIA.—The Interstate Commerce Commission has issued a certificate authorizing the Pittsburgh, Fort Wayne & Chicago and the Pennsylvania to build a cut-off line from Canton to Bayard, Ohio, 15 miles.

PENNSYLVANIA.—This company has awarded to the James McGraw Company, Philadelphia, a contract for the construction of an overhead highway bridge at Monmouth Junction, N. J., to eliminate a grade crossing; approximate cost, $50,000. A contract for the construction of a similar bridge for a similar purpose at Washington, Pa., at an approximate cost of $25,000 has been awarded to the J. G. Kenan Company, Cleveland, Ohio.

PENNSYLVANIA.—Tentative plans for a joint terminal of this company, the Hudson & Manhattan and the Public Service (street railway) at Newark, N. J., have been submitted to the director of public works of Newark. The plans would involve the extension of the Pennsylvania's New York electrified zone from Manhattan Transfer to Newark, which would then be the point of change from steam to electric power and vice versa, providing also for the interchange of downtown New York passengers with the Hudson & Manhattan, whose present stations in Newark and Manhattan Transfer would be avoided. Additional bridges over the Passaic river would be required and the total project would cost about $15,000,000, of which the city would be called upon to contribute about $2,000,000 or $3,000,000. No immediate decision is expected.

ST. LOUIS-SAN FRANCISCO.—This company has awarded a contract to the Gearhart Construction Company, Cape Girardeau, Mo., for the construction of a stucco passenger station at Sikeston, Mo., reported in the *Railway Age* of October 4. A contract has been awarded to G. W. Goodlander, Kansas City, Mo., for the construction of a brick passenger station at Neodesha, Kan., reported in the *Railway Age* of September 6.

UNION PACIFIC.—This company is calling for bids for the construction of a frame passenger station, 21 ft. by 104 ft., at North Bend, Neb. Bids will be closed on October 6.

WACO, BEAUMONT, TRINITY & SABINE.—Interstate Commerce Commission examiners have recommended that this company be granted permission to extend its line from Livingston, Tex., to a point near Port Neches but that it be denied permission to extend from Port Neches to Port Arthur. The entire proposed extension, as reported in the *Railway Age* of September 25, 1923, was to be approximately 100 miles long, of which 81 miles was to be constructed and the remainder obtained through trackage rights.

Railway Financial News

BALTIMORE & OHIO.—*Equipment Trust Certificates.*—This company has applied to the Interstate Commerce Commission for authority to issue $9,504,000 of 4½ per cent equipment trust certificates for the purpose of retiring certificates issued under the National Railway Service Corporation's equipment trust which bear interest at 6 and 7 per cent. They are to be sold to Kuhn, Loeb & Co. and Speyer & Co. at 96½.

BOSTON & MAINE.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon 5.2 miles of its Lowell & Lawrence branch, 3.2 miles of its Salem & Lowell branch and a connecting track of .42 miles.

CENTRAL OF NEW JERSEY.—*Trustee.*—The United States District Court at Philadelphia has appointed Goldthwaite H. Dorr, of New York, trustee, in place of R. E. McCarty, of Pittsburgh, who died recently. The appointment is made under the Reading segregation decree. Mr. Dorr is to serve with C. S. W. Packard, of Philadelphia.

CENTRAL VERMONT.—*Equipment Trust Notes.*—The Interstate Commerce Commission has authorized an issue of $767,000 of 5 per cent equipment trust notes to be delivered at par to the American Car & Foundry Company in payment for freight cars rebuilt by the latter.

EL PASO & SOUTHWESTERN.—*Control by S. P.*—See article in last week's issue of *Railway Age*, page 611.

GALVESTON, HARRISBURG & SAN ANTONIO.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue $978,000 first mortgage Galveston-Victoria division bonds to be delivered to the Southern Pacific in discharge of obligations on open account.

GULF COAST LINES.—*Missouri Pacific Acquisition.*—See article on another page of this issue.

ILLINOIS CENTRAL.—*Common Stock Issue.*—The directors on October 7 voted to issue approximately $11,000,000 of common stock, part of an undisposed issue authorized by the stockholders in May, 1908. The new shares will be offered to the holders of the common stock at the ratio of 1 to 10 of their present holdings, subject to the approval of the Interstate Commerce Commission.

Tentative Valuation.—See article on another page of this issue.

KANSAS CITY SOUTHERN.—*Acquisition.*—This company has applied to the Interstate Commerce Commission for authority for the acquisition of complete control of the Kansas & Missouri Railway & Terminal Company.

LEHIGH VALLEY.—*Guaranty.*—The Interstate Cmmerce Commission has certified the amount of this company's guaranty for the six months' period following the termination of federal control as $7,282,585, of which $7,000,000 had been paid in partial payments, leaving $282,585 to be paid on the final certificate.

MINNEAPOLIS & ST. PAUL.—*Rehabilitation Plan.*—The hearings on an order to show cause why a $13,000,000 rehabilitation and re-financing program proposed for the Minneapolis & St. Louis by W. H. Bremner, receiver, should not be approved was continued until October 24, when the case came up before Federal Judge Wilbur F. Booth in Minneapolis on October 4.

MISSOURI PACIFIC.—*Acquisition of Gulf Coast Lines.*—See article on another page of this issue.

NEW ORLEANS, TEXAS & MEXICO.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue and sell $2,784,000 of first mortgage 5½ per cent gold bonds for the purpose of refunding an issue of equipment trust certificates placed through the National Railway Service Corporation. It is expected that the bonds will be sold to Blair & Co., at 95.

NORD RAILWAY (FRANCE).—*Bonds Sold.*—J. P. Morgan, the Guaranty Company, the Bankers Trust Company and Harris, Forbes & Co., have sold $15,000,000 6½ per cent bonds, due October 1, 1950, at 88½ to yield 7.50 per cent. The proceeds of the loan will be used for general purposes.

NEW YORK, SUSQUEHANNA & WESTERN.—*Equipment Notes.*—This company has applied to the Interstate Commerce Commission for authority for an issue of $219,000 of 5½ per cent equipment notes at par.

PENNSYLVANIA.—*Bonds Sold.*—A syndicate headed by Kuhn, Loeb & Co., has sold, subject to the approval of the Interstate Commerce Commission, $50,000,000 40-year 5 per cent bonds at 98½ and interest, to yield about 5.10 per cent.

PORT UTILITIES COMMISSION OF CHARLESTON, S. C.—*Acquisition.*—The Interstate Commerce Commission has authorized the acquisition and operation by the Port Commission of railroad and terminal facilities at North Charleston, S. C., comprising 19.73 miles of track which are to be leased from the United States Shipping Board.

SEABOARD AIR LINE.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue $1,100,934 of 4 per cent refunding mortgage bonds and to pledge them as security for first and consolidated mortgage bonds; also to issue $1,162,000 first and consolidated mortgage bonds and pledge $1,608,000 of similar bonds as collateral for short term notes in connection with the financing of the Florida Western & Northern.

SOUTHERN.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon its line from Morristown to Corryton, Tenn., 39½ miles.

Suit.—A suit to enforce payment by the Southern Railway of $22,900,000 in dividends to preferred stockholders has been filed at Richmond, Va., by the Norwich Water Power Company, the trustees of the estate of C. D. Langhorne, and other unnamed stockholders. The preferred stockholders claim that for a number of years past the company has earned part or all of the 5 per cent preferred dividend, but has not paid it, preferring rather to retain and carry such net profits into the surplus net income account.

SOUTHERN PACIFIC.—*Control of E. P. & S. W.*—See article in last week's issue of *Railway Age*, page 611.

Dividends Declared

Atchison, Topeka & Santa Fe.—Common, $1.50, quarterly, payable December 1 to holders of record October 31.

Morris & Essex Extension.—2 per cent, payable November 1 to holders of record October 24.

Passaic & Delaware Extension.—2 per cent, payable November 1 to holders of record October 24.

Pittsburgh, Ft. Wayne & Chicago.—Common, 1¾ per cent, quarterly; special stock, 1¾ per cent, quarterly; both payable October 1. Preferred and original stock, 1¾ per cent, payable October 7.

Syracuse, Binghamton & New York.—3 per cent, quarterly, payable November 1 to holders of record October 24.

Vicksburg, Shreveport & Pacific.—Preferred, 2½ per cent, semi-annually, payable September 30 to holders of record September 29.

Trend of Railway Stock and Bond Prices

	Oct. 7	Last Week	Last Year
Average price of 20 representative railway stocks	69.53	71.23	60.25
Average price of 20 representative railway bonds	87.98	88.37	82.04

A LOAN TO YUGOSLAVIA of $3,000,000 has been made by Blair & Co., Inc., and the Chase Securities Corporation. It will run for seven months and was raised through the sale by those bankers of seven-months 6 per cent Treasury gold notes, maturing March 31, 1925. The proceeds will be used for the completion of railways now under construction.

According to a statement furnished the bankers by the Minister of Finance of Yugoslavia, the government since 1919 has acquired 500 additional miles of railroads in the Kingdom, has built 300 miles more, and is at present constructing 160 miles of new roads. The Kingdom owns 3,990 miles out of 5,940 miles of roads operating in that country.

Railway Officers

Executive

William Newsome has been elected president of the Fruit Dispatch Company, succeeding Andrew W. Preston, deceased.

D. E. Galloway, chief assistant to the president of the Canadian National, with headquarters at Montreal, Que., has been promoted to assistant vice-president of the following subsidiary companies of the Canadian National: the Montreal & Southern County, the Niagara, St. Catherines & Toronto, the Niagara, St. Catherines & Toronto Navigation Company, the Oshawa Railway, the Toronto Eastern, the Toronto Suburban, and the Thousand Island Railway River & Coal Company. **L. V. Hummell,** assistant chief of transportation, with headquarters at Montreal, has been promoted to assistant to the president, with the same headquarters, succeeding Mr. Galloway.

Financial, Legal and Accounting

J. W. Coon, assistant to the vice-president of the Delaware & Hudson, with headquarters at New York, has been elected secretary, with the same headquarters, succeeding F. M. Olyphant, deceased.

Clifford S. Beattie, whose promotion to general counsel of the Lehigh & Hudson River, with headquarters at Warwick, N. Y., was announced in the *Railway Age* of October 4, was born on June 4, 1876, at Warwick and was graduated from high school in 1893 and from New York Law school in 1899. He entered railway service on January 1, 1904, as claims attorney for the Lehigh & Hudson River and served continually in that capacity until his recent appointment to general counsel, to succeed his father John J. Beattie, deceased, who had been general counsel for the Lehigh & Hudson River since the year 1882.

Operating

James Clark, trainmaster of the Winnipeg terminal division of the Canadian National, with headquarters at Winnipeg, Man., has been promoted to assistant superintendent of the Calgary division, with headquarters at Big Valley, Alta., succeeding T. Rourke, deceased.

K. C. Spatz, road foreman of engines on the Missouri Pacific, with headquarters at Little Rock, Ark., has been promoted to assistant superintendent of fuel conservation, with headquarters at St. Louis, Mo., this being a newly created position.

H. E. Coverston, whose promotion to assistant to the general manager of the Cleveland, Cincinnati, Chicago & St. Louis, with headquarters at Cincinnati, Ohio, was reported in the *Railway Age* of September 20, was born on August 11, 1880, at Frankton, Ind. He entered railway service in April, 1894, as a messenger boy on the Cleveland, Cincinnati, Chicago & St. Louis and in June, 1896, was promoted to extra agent and operator. He was promoted to cashier at Rushville, Ind., in June, 1900, and in August, 1904, was promoted to agent at Fairmount, Ind. Mr. Coverston was transferred to Wabash, Ind., in December, 1906, and remained there until March, 1909, when he was promoted to traveling auditor. In September, 1913, he was appointed special agent in the auditing department and in January, 1916, was appointed special agent in the auditing, operating and traffic department. Mr. Coverston was promoted to special agent to the general manager in September, 1918, and while serving in that capacity assisted in the formation of the "Coverston-Saur formula" for arriving at terminal costs. Mr. Coverston held that position until his recent promotion to the position of assistant to the general manager.

Traffic

T. M. Smith, traveling freight agent of the Canadian Pacific, with headquarters at Seattle, Wash., has been promoted to district freight agent, with headquarters at Tacoma, Wash., a newly created position.

L. Solloway, acting Asiatic freight agent of the Canadian Pacific, with headquarters at Montreal, Que., has been promoted to Asiatic freight agent, with the same headquarters, succeeding G. C. Dew, who has resigned.

I. S. Morrison, traveling freight agent of the Alabama & Vicksburg and the Vicksburg, Shreveport & Pacific, with headquarters at Atlanta, Ga., has been promoted to commercial agent, with headquarters at Houston, Tex., in charge of a newly opened agency.

A. W. Aylin, whose promotion to assistant general freight agent of the Missouri Pacific, with headquarters at Little Rock, Ark., was reported in the *Railway Age* of September 20, was born on February 8, 1890, at Halhern, Leicestershire, England. He entered railway service on October 1, 1905, in the local freighthouse of the Baltimore & Ohio, at East St. Louis. From April 1, 1906, to September 1, 1909, he served in various clerical capacities in the freight traffic department of the Wabash at St. Louis, on the latter date being appointed assistant chief clerk to the freight traffic manager of the Missouri Pacific. Mr. Aylin was promoted to chief clerk in the freight traffic department at Little Rock, Ark., on October 1, 1907, and remained in that position until October 1, 1923, when he was promoted to division freight agent, with the same headquarters. He held that position until his recent promotion to assistant general freight agent.

Obituary

J. A. Reeves, formerly general freight agent of the Oregon Short Line, with headquarters at Salt Lake City, Utah, who retired in 1923, died in that city, on September 30.

Charles H. Calkins, superintendent of the Mohawk division of the New York Central, with headquarters at Albany, N. Y., died of heart disease on October 7, at his home in that city at the age of 49.

P. H. Madden, a veteran roadmaster on the Chicago, Milwaukee & St. Paul, with headquarters at Sparta, Wis., died of heart failure on Sept. 29 while on a train between Milwaukee and Chicago. At the time of his death, Mr. Madden was still in active service as a member of a special committee on reclamation.

Edward H. Shaw, vice-president in charge of traffic of the Southern, with headquarters at Washington, D. C., died suddenly of apoplexy in that city on October 7. Mr. Shaw was born on January 8, 1870, at Philadelphia, Pa., and was educated in a private school and Berkeley Military Academy, New York. He entered railway service in 1889 as a rodman for the Ohio & Northwestern (now Norfolk & Western). In 1890 and 1891 he served as clerk to the general freight and passenger agent of the Cincinnati, Portsmouth & Virginia (now Norfolk & Western) at Cincinnati, Ohio. A year later he was promoted to chief clerk and shortly thereafter to agent at Portsmouth, Ohio. In 1896 he was promoted to general agent and in 1900 he became general freight and passenger agent of the South Carolina & Georgia Extension (now the Southern) at Blacksburg, S. C. Two years later he was appointed division freight agent for the Southern at the same place. In 1903 he became general agent and assistant general freight agent for the Detroit Southern (now D., T. & I.) at Ironton, Ohio. In 1904 and 1905 he was division freight agent for the Southern at Greensboro, N. C. Then until 1907 he was assistant general freight agent at Birmingham, Ala., and subsequently general freight agent at Charleston, S. C. From 1908 to 1917 he was assistant freight traffic manager at Washington, D. C., and from then until 1918, freight traffic manager at Atlanta, Ga. During federal control he was appointed traffic manager on all lines of the Southern Railway and held that position until November, 1923, when he was appointed vice-president in charge of traffic.